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A

NEW ANATOMICAL  
*NOMENCLATURE.*

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A  
NEW ANATOMICAL  
NOMENCLATURE,

RELATING TO  
THE TERMS WHICH ARE EXPRESSIVE OF  
POSITION AND ASPECT  
IN THE  
*ANIMAL SYSTEM.*

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HONORARY MEMBER OF THE ROYAL PHYSICAL SOCIETY,  
EDINBURGH.

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ΟΥΤΙ ΤΕΧΝΗ, ΟΥΤΕ ΣΟΦΙΑ ΕΣΤΙΝ, ΕΙ ΜΗ ΜΕΤΗ ΤΙΣ.

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1803.

Presented to the College  
of  
Physicians  
The Author

TO  
DR THOMAS THOMSON,

LECTURER ON CHEMISTRY, EDINBURGH.



DEAR SIR,

I COULD not hesitate a moment about the Person to whom I should dedicate the following Essay. Our long and intimate friendship, with our frequent conversations upon the advantages that might be derived from a NEW ANATOMICAL NOMENCLATURE, led me unavoidably to think of You. Whether the Public will approve or condemn the attempt I have made, or whether they will even deign to take notice of it, I pretend not to say. But be that as it will, the favourable opinion of a Friend whom I highly respect, of one so generally

generally known as You are, and of one so eminently distinguished for learning, science, and accurate observation, will, I can assure You, ever be a source of inward satisfaction to,

MY DEAR SIR,

Your's very sincerely,

JOHN BARCLAY.

EDINBURGH, }  
*April 20. 1803.* }

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NEW.

## INTRODUCTION.

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THE chemical analysis of the springs, wheels, and pivots of a watch, never can explain its movements, nor its uses; nor the chemical analysis of the bones, muscles, blood-vessels, and nerves, their functions in the animal. Many of the functions depend evidently on mechanical causes, and many more originate in a cause which seems to be neither chemical nor mechanical.

In every living organised structure, there is plainly a power that preserves, regulates, and controls the whole; directing at first the different processes in forming one part of the organs, afterwards employing the assistance of the organs which it has formed to produce more, till at last it completes the whole of the system in such a manner as to suit its future conveniences and wants. In these operations we see it observing determinate proportions,

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magnitudes, forms, numbers, &c. ; marking the times, seasons, and circumstances for every change in structure or function ; daily continuing to supply the parts in proper time and in due proportion with the vigour of life ; and carefully repairing their wastes and their injuries, till the period fixed for their final dissolution. This power, or rather this agent, physiologists have named the *vital principle* ; though not a few are inclined to suppose it, to be the effect, rather than the cause, of the organization. They adopt an hypothesis similar to theirs, who, finding a chemist always in his laboratory, are led to imagine that it could not be he who formed the laboratory, but the laboratory, on the contrary, that formed him. At the same time, we should err egregiously if we ascribed the plan of the system to this vital principle. In constructing the body, it acts, not like the chemist, with any design or foresight of its own ; but, in all operations that are performed without either volition or consciousness, appears subordinate to a much higher Power—to that almighty and omniscient Being,



Being, who dispenses his laws to the boundless universe, and whose laws, except by Himself, can never be improved, altered, nor abrogated.

As in every species of living body, the individuals are, bating the usual differences of sex, all constructed in the same way; and the vital principle always confined in its operations to specific forms, structures, and organs, and specific modes of connection and arrangement—it necessarily follows, that there must be as many vital principles, specifically distinct, as there are species of organised structures. The various phenomena in which they agree, and in which they differ, are to be learned in studying their functions, manners, and habits, and in examining and comparing the structures which they produce: For, like to oxygen, hydrogen, and azot, which act so very important a part in the economy of Nature, they are known only from their effects; and however anxious those may be, who can trust only to the evidence of sense, to see, handle, taste, and smell them, they have never yet been detected nor examined in a sepa-

rate state, and probably never will, unless the belief and conviction of mankind, in this respect, appear an object of greater importance to the Author of Nature than they seem to have been hitherto.

With a knowledge of such different causes operating within us, we, in all physiological investigations, should carefully distinguish between what is chemical, mechanical, and vital; and endeavour to ascertain, by due experiment and observation, the part which each acts in the system, and how they usually oppose, assist, and regulate one another for the general good. But to make these experiments and observations, we should likewise know how to examine and accurately describe organised structures. This information we are naturally led to expect from anatomy; while, unfortunately, anatomy has not always in its power to give what we look for. A cursory glance must demonstrate to any one, that these structures are complex and varied; that much depends on position and direction, on relative situation, connection, and aspect; and that no clear or accurate description

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tion can possibly be given, where a language is wanting to express these circumstances. Such a language, it is much to be regretted, is not at present known in anatomy ; although the want of it has often been felt, often complained of, and partial attempts frequently made to remedy the evil.

The vague ambiguity of such terms as *superior*, *inferior*, *anterior*, *posterior*, &c. has been felt and acknowledged by every person the least versant in anatomical description. Vicq D'Azyr, who saw the confusion with which they were attended in comparative anatomy, had resolved to reject them as definite characteristic expressions ; and perhaps had he seriously thought of their consequences, would have rejected them as occasional adjuncts. But with all respect for so great a man, he saw more clearly to point out the error than to remove it. His terms *occipital*, *sincipital*, and *frontal*, to denote three aspects of the head, are borrowed from bones, none of which are ever confined to a single aspect ; and his use of

compounds, in which prepositions, with a sense equivalent to our *under*, *above*, and *before*, enter as parts, was scarcely more than exchanging an old error for a new. His division of the body into numerous regions different from those expressed by *superior*, *inferior*, &c. and with the intention to get quit of these terms, has been equally unsuccessful. The division on which they are founded is natural; and shown, by experience, to be not only convenient and useful, but even necessary. It was not therefore the division that was faulty, but the expression; and D'Azyr, notwithstanding his new arrangement, is often obliged to recur to the old, and make use of the language which he had condemned.

Chaufsier, in his Tabular View of the Skeleton, expresses position by a reference to the parts in vicinity or contact. Thus the two extremities of the clavicle are *sternal* and *acromial*; the two of the humerus, *scapular* and *ulnar*; the two of the ulna, *humeral* and *carpal*; the rows of the carpus, *radial* and *metacarpal*; and the two extremities of the meta-

carpus,

carpus, *carpal* and *digital*. When he comes, however, to the digital phalanxes, and wants the necessary terms of distinction, he is forced to invent for the first, second, and third, or what I would call the *proximal*, *medial*, and *distal* phalanxes, the terms *phalange*, *phalangine*, and *phalangette*. This method of expressing position by a reference to the parts in vicinity or contact, has long been known, though hitherto too sparingly employed. It is attended with peculiar advantages in minute description, and is a part of the general plan which is recommended in the following Essay. But though useful in its place, it must be obvious that it does not supersede the general division into those regions denoted by the words *superior*, *inferior*, &c. We describe not a country by enumerating all those that surround it; we wish to know how each part lies with respect to the east, west, south, and north, and all their subordinate divisions in the compass; and to satisfy the mind, must also be informed of what is its general situation on the globe. Although I be told that one extremity of the clavicle is



*sternal* and the other *acromial*, I may still wish to know what is the aspect of these two with regard to the trunk, and what are the aspects of its other four sides. More general divisions here become necessary; and Chaussier therefore, as well as D'Azyr, who found the necessity of such divisions, is likewise obliged to have recourse to the old terms *superior*, *inferior*, &c.; or to use compounds of which prepositions equivalent to *before*, *under*, *above*, constitute a part.

In the following Essay I have retained the usual divisions, and ventured only to change their nomenclature: the intelligent reader must decide on the merits of the change proposed. The general views by which I was guided are explained in some preliminary discussions on the nature of language and of nomenclatures, particularly the nomenclature of anatomy. And should what I have done be compared to a building, it may be said that the general plan of the fabric is new, the several apartments more regular and uniform, more convenient, and extensively useful; at the same time that most  
of

of the materials, and some subordinate parts of the work, were already prepared, and are only new-modelled and arranged, to suit the design and outline of the structure. The terms indeed which are here suggested are chiefly confined to the expression of position and aspect; but are so contrived as to form an independently distinct nomenclature for general description in all the different branches of anatomy, and may be used while the other names continue as they are. Should they fortunately meet with the approbation of the public, I shall afterwards show their application in detail; and add, on a general and connected plan, the nomenclatures of the BONES, MUSCLES, BLOOD-VESSELS, NERVES, LIGAMENTS, &c.

In the names of the BONES few changes will be introduced: there is no good or rational objection to their usual arrangement into bones of the head, trunk, and extremities; and tho' some of their names might have had originally different meanings, yet as they have long ceased to convey them, and are now entirely appropriated

ted to anatomy, it would answer no reasonable end to run back to the æras of antiquity, and to conjure up ghosts and spectres from oblivion to confound and embarrass them in their present office. The depressions and processes of the different bones may probably require some kind of arrangement, as those of different forms and uses are at present expressed by the same term.

In the names of the MUSCLES it will easily be foreseen that more changes will be found necessary. Some are distinguished by such epithets as *superior*, *inferior*, *anterior*, *posterior*; some by the epithets *oblique* and *straight*; some by the epithet *ferratus* or *ferrated*; some by epithets descriptive of their form, which, if they be used as arbitrary terms, and have ceased to convey any allusion, are harmless enough; but if they happen to convey an allusion, or refer to characters that are found only in the human body, they naturally become a source of ambiguity, and when limited in sense can seldom be extended to comparative anatomy.

Some



Some names are a kind of descriptions, pretending to explain uses and functions, which those who imposed them did not understand. In all cases these descriptions are extremely imperfect; often are false; and should we credulously receive them as complete, and proceed to reason upon them as data, they must always lead to erroneous conclusions. On this principle some muscles are named pronators and supinators of the radius; some flexors and extensors of the carpus; as if these were the only muscles concerned in performing such movements. Now every anatomist certainly knows, that all the digital flexors and extensors that arise from the humerus or fore-arm, must likewise be flexors and extensors of the carpus; that the sublimis, the radial flexor, and palmaris longus, assist in pronation; that the supinator radii longus brings the arm to the middle position, between pronation and supination, and then acts as a flexor of the fore-arm; that the biceps, attached to the scapula and radius, is  
an

an extensor of the humerus, a flexor of the radius, and one of the most powerful of its supinators; while other muscles, as the extensor tertii internodii pollicis, although indirectly, occasionally assists it, in that office. From the variety therefore of functions, in which muscles attached to the bones are usually concerned, every name imposed with a view to denote these functions must either be uncommonly long, or extremely imperfect, with regard to description; and if any such be retained in anatomy, it ought to be intimated that the function implied is merely the function that characterises it, and not the only one it performs.

Of all the names that have been hitherto imposed on the muscles, the best are those which are made to distinguish them by their origin and insertion, or the attachments at their opposite extremities. This was certainly demonstrated by Winslow; although the great and accurate Albinus, who had the writings of Winslow before him, seems to have thought otherwise. Most anatomists are pleased with  
such

such names as *stylo-glossus*, *stylo-hyoideus*, *stylo-pharyngeus*; and have often regretted that all other muscles were not named and distinguished in a similar manner. It was to comply with this general wish, and their own opinions upon the subject, that Chaussier and Dumas have, each on these principles, given us a new nomenclature for the muscles; although, in the execution of their plan, they perhaps have not fully answered expectations. Unfortunately imagining, that a principle, if right, could not be carried too great a length, they seem to have forgotten the old, though just, observation of the poet, that

*Est modus in rebus; sunt certi denique fines,*

*Ultra citraque nequit consistere rectum.*

Such names are admirably calculated for muscles that have only a simple origin and a simple insertion; but where the origins and insertions are numerous, the name that pretends to enumerate the whole must often run out to the length of a sentence. It will therefore be difficult to reconcile the anatomist to such names

as, *Sterno-costo-clavio-humeral*, *Pterigo-syndesmo-staphili-pharyngien*, *Sus-spini-scapulo-trochiterien*, *Sus-optico-sphero-scleroticien*, *Occipiti-dorso-clavi-sus-acromien* \*.

As names were intended to mark objects in a general way, with a view to supersede the tediousness of description, to accelerate intercourse, and to make our language keep pace with our ideas; any attempt to reverse the procedure, to check the natural ardour of the mind, to retard its operations, and increase the difficulty of literary intercourse, appears to be rather a retrograde step in the way of improvement. Birth, marriage, funeral, and triumph, are four words each of them denoting a group of circumstances. Now suppose we intended to inform our hearers that we had been witnessing such groups of ceremonies; and that, instead of the general

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\* *Pectoralis Major*; the *Pterigo pharyngeus*, the *Syndesmo pharyngeus*, the *Staphyle pharyngeus*, or including all under one name, *Constrictor superior*; *Supraspinatus*; the *Rectus superior*, or *Levator oculi*; *Trapezius*.

ral names, we made use of minute and particular descriptions, the day would fail before we could inform them that we had been witnessing a birth, a marriage, a funeral, and a triumph.

Many names in Dumas are liable also to another objection: Besides admitting such words as *intus*, *extus*, *intra*, *extra*, *sus*, and *fous*, he has often founded his names on circumstances that are peculiar to the human species. Muscles of similar situations and functions have not the like origins and insertions in all animals; and if we should always vary the name with the varying circumstances on which it is founded, we should often imagine things to be different which in all essential points are the same.

In many cases a different arrangement would exhibit the origin and insertion of muscles without the assistance of long names. Suppose that one genus of muscles were the muscles attached to the humerus by insertion, it would surely be unnecessary to mention this circumstance in the name of every individual muscle.



muscle. Suppose, again, that these muscles of the humerus were subdivided, according to their origins, into muscles of the *spine*, *sternum*, *clavicle*, and *scapula*, it would be equally unnecessary, after knowing what muscles originate in the scapula and terminate in the humerus, to repeat the information in the name of each muscle. Would it not be sufficient, after knowing where they originate and terminate, to mark them by some individual distinction, which would not require a very long name? nor would it be necessary to mark every individual distinction, but the most obvious and characteristic, leaving all the rest to be noticed in the history and the description. Thus sterno-humeral, or sterno-humeren, could possibly signify no other muscle than the pectoralis major; although this muscle, upon examination, would be found to originate, not only from the sternum, but ribs and clavicle; two origins, which might be omitted at least in the name, as they are common to some other muscles inserted in the humerus, to the deltoid for instance, which  
arises

arises from the clavicle, and latissimus dorsi, part of which arises from the ribs.

The muscles have been classed according to their strata, and according to the different regions which they occupy for the purpose of dissection; they have also been classed, by Cowper and others, according to the bones in which they are inserted; while Winslow, to show a more general connection, has, in regular order, enumerated the bones, with their muscular attachments, whether by origin or by insertion. This method, if the muscles which originate and the muscles which terminate in every bone had been separately arranged, would have superseded the necessity of Cowper's, and would itself have been greatly improved, had the remaining attachments of the muscles been exhibited according to their origin and insertion in lateral columns. To illustrate the idea which I mean to convey, suppose that we took the muscles of the humerus by way of example, I would form, in the first place, three distinct columns, as represented in the following Scheme.

B

MUSCLES

## MUSCLES OF THE HUMERUS.

## Origins of the Muscles terminating in the Humerus.

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 { . . . . .  
 . . . . .  
 . . . . .  
 . . . . .

*Muscles terminating in the Humerus.*

*Parts besides the Humerus in which they terminate.*

A page from a handwriting practice book. It features ten rows of dotted lines for tracing. The first four rows are grouped by a large bracket on the left, and the next six rows are grouped by a smaller bracket. Each row contains ten dots for tracing practice.

Other origins besides the Humerus.

[illegible]

Muscles originating in the Humerus.

[illegible]

*Parts in which the Muscles  
originating in the Humerus,  
&c. terminate.*

[illegible]

The



The middle column to contain all the muscles belonging to the humerus by insertion or origin: the muscles inserted to be placed first, and the muscles originating to follow next, and their names to be printed in a different character, the more readily to strike the eye.—The column on the left to contain the origins of the muscles inserted, and the other origins which the muscles originating may happen to possess besides the humerus.—The column on the right to contain the terminations of all the muscles that originate in the humerus partially or wholly; and any terminations, should there be such, that they chance to possess in common with the humerus.—In all the columns the connections by origin to be printed in one character, and those by termination to be printed in another; but with this truth always in view, that the origin of a muscle means nothing more than what is in general its most fixed point; and that the part in which it terminates may, by the action of other muscles, be occasionally made the most fixed of the two: thus the scapula, for instance,

by reverſing the order, may ſometimes be made to move on the humerus, and the humerus on the fore-arm, by the ſame muſcles that made the fore-arm to move on the humerus, and the humerus on the ſcapula.

A tabular view of this kind would exhibit a very general connection and mutual dependence of various movements, though it would not be ſufficient to explain the motions of the animal ſyſtem. In this Eſſay I have given ſome idea of the numerous combinations into which the muſcles are capable of entering; although theſe combinations are not ſo numerous as the various poſitions which they produce: For ſuppoſe that the fore-arm, during its flexion, ſhould deſcribe, by the points of the fingers extended, the ſegment of a circle, of which the elbow-joint is the centre, that ſegment may be divided into more than a hundred thouſand parts, eaſily diſtinguiſhable by the naked eye: Now at each of theſe parts the flexor and extenſor, by acting with equal degrees of force, can arreſt the motion, and retain the arm in as many  
thouſand

thousand different positions. From this we may be able to form some idea, though vague and general, of the immense variety of positions which a small number of muscles can produce, that are capable of entering into some millions of different combinations; seeing that two, confined entirely to the simple motion of flexion and extension, on the same plane, can produce so many.

The names which allude to the functions of muscles, and those which distinguish them by origin and insertion, have, from an opinion that they were data, which, with little addition, were sufficient to explain the animal motions, been generally deemed of more importance than they really are. An accurate knowledge of their several attachments is certainly necessary; but as most of the motions are in the diagonal of different forces, and performed by a number of muscles at a time, to understand these motions completely, we should know all the organs concerned, the joints and the ligaments, as well as the muscles; and of

the muscles, not only their names, their origins, and insertions, but their relative strength, position, and direction, and especially how they combine and co-operate ; and if we undergo all this trouble, in order to explain the animal motions, we ought surely to know what we are in search of, and be able to say what these motions are. The first thing then to be done is to find out the motions ; to class, arrange, and distinguish them by names, from our remarks on the living body, where they are best observed and ascertained. The anatomist and physiologist, in examining the subject, have then to point out, in their demonstrations, how each is produced, and by what organs. The head, to make use of the common language, moves forwards, backwards, to each side, and in all the intermediate directions ; I would ask here, How these different motions are performed, and by what muscles ? Let us take, for example, the motion forwards ; and not to confuse the description with too minute an investigation, let us suppose that the sterno-mastoids alone perform that motion.

motion. The sternal extremities of the clavicles, to which they are attached, must first be fixed by the intercostals and abdominal muscles; and the scapular extremities by the muscles of the scapula, humerus, and the two subclavii. Suppose now that the sterno-mastoids are ready to act, and to bring the head in the diagonal between their forces, What are the muscles employed to prevent the lateral and rotatory motions of the neck? What are the muscles opposed to the action of the sterno-mastoids, and to limit their effects, if it be necessary to fix the position? What are the muscles if we stand erect that balance the body upon thus changing the position of the head? and, What is the manner in which they co-operate in order to produce what is intended? Were we accustomed to put such questions frequently to ourselves with regard to the motions and positions of the system, and to study their answers, we might soon acquire a more perfect knowledge of muscular action than we have at present; be better prepared to treat cases of luxations and fractures;



and to place the parts in easier attitudes after reduction. Our progress, too, would be greatly facilitated by a tabular view of the principal positions and motions of the system, exhibiting under each the several muscles that act as fixors, motors, antagonists, directors; and leaving the manner in which they combine to produce their diagonal or compound motions; the manner in which their levers are lengthened or shortened\*; and the manner in which membranes, ligaments, articulations, and cartilages, by their strength, structure, elasticity, or gravity,

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\* The variation of the centre of motion between two antagonist muscles; the consequent change that necessarily takes place in the relative length of their two levers; the manner in which their mechanical power is thereby either increased or diminished; and the manner in which their contractile power is made to undergo a similar change by the convexity or concavity of the joints over which they pass to the place of their insertion—are all curious subjects of inquiry, and if understood might illustrate many interesting phenomena in the animal œconomy.

vity, conspire to limit, regulate, or antagonise them, to be explained in a separate description.

The celebrated Winflow had a general idea of such a plan, when he divided the motions of the system into those of the head, trunk, &c. and under each enumerated the several muscles concerned, with their attachments. But although he knew, he has not expressed the necessary connection between distant motions in preserving the equilibrium and position; nor has he divided the motions of the parts into different kinds, nor shown how the muscles combine and co-operate in performing each, by producing their effects in various diagonals.

In the VASCULAR SYSTEM comparatively few changes will be necessary, with respect either to names or arrangement. Many of the vessels are well named from their situation, or from the organs on which they are ramified; but improperly distinguished by such epithets as *superior*, *inferior*,

*rior, anterior, posterior, &c.* and sometimes not distinguished at all by such epithets as *humeral* and *femoral*, that occasionally are employed to express two very different relations. Thus an artery is humeral when it runs along the course of the humerus, and likewise humeral when it enters the bone to supply it with nourishment.

When they are distinguished by the epithet of the organ on which they are ramified, it often happens when the organ has, or has had, two names, that the name of the artery alludes to the one which is least in use, or to one that is obsolete. Thus the arteries and nerves of the diaphragm are called *phrenic*, containing an allusion to its old name *phren*. The arteries of the stomach are all gastric, and those of the omentum all epiploic, referring to the names *gaster* and *epiploon*. In the same way, a muscle of the tongue, one of the branches of the fifth pair of nerves, and the large artery, are all lingual, from an allusion to its Latin name *lingua*; while its other muscles  
and



and nerves are glossal, from an allusion to its Greek name *glossa*.

To remove this redundancy of language, every organ should have one name, and but one only ; and to that name the allusions contained in the names of its muscles, nerves, arteries, &c. ought to refer. In determining, however, which of the names ought to be retained, some discretion will certainly be requisite. For my own part, I would always prefer that name which, *cæteris paribus*, is likely to be attended with the fewest changes in the present nomenclature. Thus I would prefer *glossa* to *lingua*, as most of the references there are to the Greek, and expressed in compounds of the Greek language, none of whose parts would so readily unite with the word *lingual* as they do with *glossal*, a union to which the eye and the ear have both been accustomed: on the other hand, *lingual* enters into no compound used in anatomy, and the term *glossal* might be substituted for it, with few changes and no inconvenience.

Another

Another objection to the present nomenclature of the vascular system is, that many of the trunks, considered as wholes, have no names by which they are or can be distinguished; while the several parts of which they are composed are regularly described as distinct vessels. Thus we have gotten a subclavian artery, an axillary artery, and a humeral artery, all parts of the same trunk, which has not itself received any name. We have also a common iliac artery, an external iliac artery, a femoral artery, and a popliteal, all continuations of another trunk, which likewise, as a whole, still remains nameless. This defect is the less excusable, as the nomenclature is already overloaded with a number of names belonging to trifling and irregular branches; as may be seen in Murray's description of the smaller branches of the cœliac, ophthalmic, the subclavian, internal iliac, &c. In these descriptions, it must be confessed, he has imitated Haller; a name whose influence must always be great while anatomy is regarded or studied as a science.

But

But Haller, though possessed of all the learning of the ancients and moderns; though ignorant of nothing belonging to anatomy; though he added many discoveries of his own; was never surpassed, and seldom been equalled, in collecting facts, and describing them minutely—yet was little intent on their general classification and arrangement; and provided he could enumerate all that was known, was little disposed to estimate the difference between regular and irregular appearances, or things of importance and of small value.

In the NERVOUS SYSTEM still fewer changes will be necessary, if we retain their numerical names; and to these names no forcible objection has been made. They express not indeed the origin, termination, or functions of nerves; but they mark out the place of the series in which they pass through the holes or interstices of the different bones; and as that series is clear and distinct, they are easily found out on dissection. A few varieties occur in the  
mode

mode of enumeration; but they are trifling, and the inconvenience easily removed. The question here is, Whether or not should we begin to enumerate the cervical, dorsal, lumbar, and sacral pairs, above or below the first of the vertebræ in these regions? Say above or below, and the business is settled; or let every one follow his own method, the inconveniency will not be great. The series, taken as a whole, is regular, and we know where it commences and terminates; the only difference is about the commencement and the termination of these divisions. Dumas, in writing upon this subject, has confounded two things that are perfectly distinct. It is not with the nerves as it was with the muscles, when they were distinguished by numerical names: in that case there was no series or order of succession but what was arbitrary; and every anatomist, unless when occasionally a little assisted by the strata or layers, was left to begin and end the series of his own creation wherever he pleased. After knowing the series in which the primary  
trunks

trunks of the nerves succeed one another, no names can be more definite than the numerical, they never fail to direct the anatomist to the very spot where the nerve is to be found; whence he may afterwards trace it to its origin, or follow its branches to their termination.

I agree with this excellent physiologist, that names, founded upon the supposed functions of nerves, would be apt to mislead, and be the means of propagating error rather than science; but hardly can see how the trunks of nerves could be named from their origin and terminations. The specimen he has given in the new name of the olfactory nerve, is no flattering recommendation of his plan. He proposes to distinguish the trunk by the term *striato-narinal*; the division which terminates at the ethmoidal bone by the term *striato-narinal-ethmoidien*; and the part which is ramified on the pituitary membrane by the term *striato-narinal-pituitaire*. This tiresome repetition of the name of the trunk, in the names of all the divisions  
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and branches, would not only be exceedingly cumbrous, but unnecessary. In the system of Linnæus, man belongs to the genus *homo*, to the order of *primates*, and the class of *mammalia*; but did it ever enter the mind of that naturalist to suppose that the genus would be better expressed by the term *mammale primas homo*, than by simple *homo* taken by itself. A name is one thing, classification another, and description a third. From not making this necessary distinction, Dumas, in trying to impose names, is constantly labouring at a sort of classification and description; so that his descriptions are often bad names, and his names more frequently worse descriptions.

In the nervous system, if the trunks retain their numerical names, the branches, like those of the vascular system, might be named from position, or from the organs on which they are ramified. To distinguish at least some of the trunks by the name of their origin, and the terminations of their different branches, would fill a page; or suppose that  
one



one termination were preferred, and the rest excluded, this new name could not possibly convey any idea of the general distribution and ramification more than the present.

To answer the purposes of the medical practitioner, and sometimes physiologist, the nerves should likewise be classed in a manner different from that which is used by the dissector. The dissector, if he follow a regular method, begins at their origin, and then proceeds to their ramifications, where he often finds a number of branches entering and mixing in the same organ; a number of branches proceeding from trunks, which are placed at a distance with respect to their origin, and which, in regular anatomical description, are not made to follow in the order of succession. On the other hand, the physiologist and medical practitioner, in treating of the functions or diseases of an organ, must begin where the anatomist ended; and in their recollection trace the nerves from their ramifications back to their origin. Suppose the tongue the subject of inquiry, they will try to

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recollect, What are the nerves with which it is supplied? What are the other parts of the system on which these are ramified? What are the other connections which they form? and, What is the result of these connections in health and disease? A tabular view, therefore, of the nerves, beginning at their origin, and exhibiting their branchings and anastomoses; and another, commencing at the different organs, aspects, or regions, and retracing their connections back to their origin—would be highly useful to the medical practitioner, the physiologist, and comparative anatomist. It is true that something of this kind has frequently been done in books of anatomy, but not on the same general plan that is here recommended. The nomenclator, from such tables, might also derive considerable advantage; and would see the danger of classifying objects, and of founding names upon a contracted view of the subject.

In treating of the **LIGAMENTS**, some other  
division

division seems to be necessary besides that into ligaments of the hard and ligaments of the soft parts ; while a subdivision merely, according to the regions which they occupy, confounds together things that are different, not only in form, but in structure and function ; though if an arranged and general view were first given of the different kinds belonging to the bones, muscles, and viscera, a description of each, according to the several regions which they occupy, would then be not only natural but proper. Thus plants and animals, in the system of Linnaeus, are first arranged by some common properties ; and then the climates, countries, or places which they inhabit, are usually mentioned if they be known.

But in treating of the general connections of the system, the view is imperfect, if we do not likewise consider how far, and in what manner, the skin, the cellular substance and muscles, the nerves, the blood-vessels, and the absorbents, contribute their share in supporting and forming the general union ; nor is it only

this species of union, but every connection or relation whatever among the organs, that we ought to study and carefully examine, if we mean to explain the symptoms of disease, and many of the singular phenomena of sympathy.

Connection, or at least a degree of relation, arises from mere situation and attachment; from being concerned in the same motions or the same positions; from being supplied by the same nerves, the same arteries, the same veins, or the same absorbents; from being enveloped in the same membrane; from having somewhat of a similar structure, or similar properties, with regard to external or internal agents; and not unfrequently from being concerned in the same functions. Thus the skin, the internal surface of the lungs, the intestinal canal, and the kidneys, besides performing their peculiar offices, all co-operate in discharging a noxious fluid from the system; and when one of them ceases to perform its share, a greater proportion of the business or labour falls upon the rest, till every one, communicating

ting as it were its distressed situation to the parts connected, and these to the parts connected with them, the alarm becomes general ; all feel and all act as if interested in a common cause ; and all co-operate in resisting the disease, or in their attempts to restore health.

These ideas of extended connection should prevent the nomenclator from imposing names that allude to limited or partial functions ; and should naturally lead to this observation, that can hardly be too often repeated, that we want, not merely terms in anatomy, but general and connected views, a distinct classification and arrangement ; and that the nomenclature ought to be so formed as best to promote and facilitate the attainment of these objects. In our present nomenclature, to give but an instance of this inaccuracy in classification, what a strange variety of organs, differing in form, structure, and uses, is expressed by the words *ventriculus* and *sinus*.

Partial attempts to amend this nomenclature, and with a view to particular objects,



have, instead of improving it, been only the means of loadening it with synonymes that were already by far too numerous. Every intentional change in a language ought to be made with caution and care, and on general principles that regard the whole: these principles should likewise be fully explained to the public, that they may be able to judge of their importance: “for however desirable it might be, says Degerando, to possess a language perfectly methodical, it would be an event exceedingly deplorable if, under every frivolous pretext, we were to be infested with the restless mania of making nomenclatures. If every professor, for instance, in his lectures, or every author in his writings, should, on slight occasions, think himself intitled to introduce a new language of his own creation; from such a mixture of different idioms, the consequence would be, that, instead of having a methodical language, we at last should have no language at all. The diffusion of knowledge, from being accelerated, would be retarded



ed or entirely interrupted; disputes would originate on every side; and the literary world soon become a prey to all the confusion of distressful anarchy \*."

I am fully sensible, and will readily acknowledge, that no changes in our present nomenclature ought to be made without weighty and important reasons; and that these changes should never be extended beyond what are its errors and defects. It were to be wished that even the most weighty and important reasons had influence sufficient to remove these: for the same Degerando, who saw that Reason was often vanquished in its contests with Prejudice, proceeds to observe—"That whatever the merits of a language may be, if it once has received the sanction of time and the suffrages of mankind, the philosopher will find it no easy matter to change or improve it. He may, if he choose, demonstrate its faults

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\* Des Signes et de l'Art de Penfer considérés dans leur Rapports mutuels. 3d Vol. p. 196.

and its imperfections ; but if he presume to offer to the world the model of another, though more regular and systematic, there is no quarter from which he has not to expect opposition. He will have, in this daring and hardy attempt, to combat at once the prejudices of the vulgar and pretensions of the learned. The former will bring in a phalanx against him ; all those strong and sacred regards that are due to old and established customs ; customs supported by the conduct of thousands who have gone before him, and the tacit approbation of illustrious names who are universally held in esteem and high veneration. The least reflection is sufficient to convince us, that their recollections and their ideas must rest upon names ; and although erroneously, they will almost unavoidably, draw the conclusion, that it is impossible to change the one without likewise changing the other, and throwing the whole into disorder.

“ The learned, on the contrary, will dislike a reform that may appear to confer on its author a sort of dominion over the science. They will  
grant,

grant, perhaps, that the language proposed is preferable to that already in use ; but before they adopt it, they will require a demonstrative proof that it is likewise the best possible. We ought not, they will say, to reject a language already established, unless we be assured that the one which is to be substituted for it is liable to no sort of objection ; or that it will in future preclude the necessity of new innovations. If it should happen to proceed on a system, and that system in any respect owe its support to disputed facts or contested opinions, the opposition will be still more violent. Those who find their opinions overlooked, or the decision given against them, will naturally be disposed to reprobate the whole, and watch opportunities to treat it with invectives. Even former habits with the learned themselves, if they yield at all, will yield with reluctance ; for there is evidently in the nature of man a strong predilection for all those means which he has found instrumentally useful in promoting his schemes : and we find the learned, as  
well

well as the vulgar, attached to the words which they have long been accustomed to use, and very often in proportion to the labour which they have bestowed on their acquisition.

“ Nor are these the only sources of difficulty which a new nomenclature has to overcome, or of disappointments which it has to look for. Be they learned or unlearned, the indifferent will treat it with coldness and neglect; the indecisive will doubt and hesitate, and withhold their opinion till its fate be determined: and although it should answer the purposes intended, the invidious will naturally feel hurt at seeing others attaining their object at a less expence than they did themselves; for in their estimation, science, like a diamond, should derive its value from its rarity, its price, and the difficulty of procuring it; add to this, that the timid and desponding will, without the trouble of making the distinction, express a distrust in all innovations, and the indolent see nothing in such an improvement but the grievous trouble of learning new terms; while the man of  
words

words will be indignant at the thoughts of a language whose clearness and precision may check the flow of his loose declamations, or be the means of detecting his ignorance."

From such a concourse of dispositions, interests, and habits, all combining to oppose the introduction of a new nomenclature, Degerando thinks that its own merit will have little influence in recommending it to notice and attention; and therefore imagines that nothing almost but the magical power of a celebrated name; a name inspiring confidence and awe, and whose very sound can silence the passions, gain prejudices over to its side, and lead the judgment as it were in chains, will ever be sufficient to secure to it any thing like a general reception among those of the profession. But though I must confess my high respect for such an authority, I am far, however, from being of opinion that men are so much the dupes of envy, prejudice, and meanness, as this author seems to insinuate.—I know well the numerous difficulties which the great discovery of the circulation had to encounter;



encounter ; and what opposition was for some time made to the doctrine of absorbents. But the difference between these important discoveries and a new nomenclature is immense. These discoveries were not foreseen ; the want of them was not felt nor complained of ; men were satisfied with what they knew of the course of the blood ; and absorption by the veins was an opinion which they considered as almost capable of demonstration.—A new nomenclature is not to be classed with these important and brilliant discoveries. In comparison with them, it ranks low in the registers of Fame. As a work of mere patience and industry, it aspires to no lustre or eclat, it promises no immortality to its author, nor secures to his name any enviable marks of distinction ; it is nothing more than what anatomists have long wished for, a desideratum which they have often attempted to supply by partial amendments ; and if a whole or complete system be still wanting, it is probably because no anatomist of rank or eminence would  
sub.



submit to a task where the drudgery was so great and the prospect of reputation so small.—This nomenclature is not to be compared with that of Lavoisier; it establishes no æra in science, it announces no great revolution, nor is formed with a view to perpetuate any illustrious discoveries.—To compare a small thing with a great, it bears a much nearer resemblance to the classification and arrangements of Linnæus; which though they have greatly facilitated the improvement of every branch of natural history, yet imply so little of that enviable character of genius, that those who have improved and enlarged his system, have seemingly thought it no sacrifice of their own reputation to allow their large and numerous additions to pass with the public under his name. But small as that credit may be which is attached to a work of mere labour and industry, the claims of a new anatomical nomenclature cannot be great, even in this view. It cannot pretend to instruct the learned, or to give them new ideas of the animal structure; its influence

fluence extends to what must appear only a speck in the map of science; and yet even there, if it should facilitate the progress of study, and remove only a part of the rubbish that obstructs the journey, the author will consider his object as attained.

*NEW*

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ANATOMICAL NOMENCLATURE.

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PART I.

*Relating to the Terms intended to express POSITION and ASPECT in the Animal System.*

CHAP. I.

ON LANGUAGE AND ITS KINDS.

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THE technical terms of an art or science are what is meant by a nomenclature. The nomenclature peculiar to anatomy forms the subject of the following treatise ; where the merits of that nomenclature are examined, some important changes proposed, and some of the general principles of language previously considered,

dered, with a view to illustrate some of the reasons on which the proposed changes are founded.

In its primary sense, *language* is a word synonymous with *speech*; in a general sense, any species of signs employed as expressions of our thoughts or sensations, in the glowing imagery of poetic figure, it is any phenomena presented by Nature, speaking as it were to intelligent minds, and suggesting ideas which they had not before.

Every language employed by man is one or other of two kinds—it is either *natural* or *artificial*. We call it *natural*, when its signs and meanings are physically connected; when we perceive the force of it by instinct, and understand it without explanation: We call it *artificial*, when its signs and meanings have nothing of this physical relation; when the two are connected by some accidental association, or by some association founded on previous agreement and contract.

Man, if he chose, might have five languages,

ges, corresponding in number to the five senses; although there be few perhaps who have thought of making a language out of smells and tastes.

Smells and tastes indicate several important properties in animal, mineral, and vegetable substances; and more of such properties might, doubtless, be discovered, were the senses to which these signs are addressed more generally or studiously cultivated. But both senses being rather passive in the exercise of their functions, the signs addressed to them are very little under our management; and those impressions which they happen to make on the sentient organs are so various in various persons; so faint, so permanent, or so powerful, that they rather deter than invite curiosity to make the attempt. They are sometimes so violent as even to affect the structure of their organs; and generally raise so strong prepossessions for or against them, that the senses, under the strong influence of association, are forced reluctantly to contract habits by

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which

which the primary impressions are blunted, and objects made to give pleasure or disgust which formerly excited an opposite feeling. The senses, too, from being contiguous, are in danger of having their impressions confounded, particularly when the objects presented exhibit both an odour and taste. For these reasons, odours and tastes, however susceptible of combination and variety, and however expressive of certain distinctions, have seldom been employed as the vehicles of thought; and the two senses, by which they are perceived, seldom cultivated for any noble or valuable purpose.

The signs of touch, though few in number, and likewise imperfect, have attracted more general attention. At Mecca, and some other places of the East, merchants employ them as a medium of intercourse; thrusting their hands into one another's sleeves, and by means of the fingers conversing together beyond the possibility of being seen or heard. The deaf employ them by laying their hands on the lips  
of



of their friends, feeling what is meant, and then returning an answer to the touch instead of the eye, when they wish to hold conversation in the dark. The cases, however, are extremely rare where they can be used with any advantage : when those who converse are removed to the distance of a few feet, they become useless ; they, besides, are so few, so indistinct, so complex, and so difficultly learned, that mankind, even in the closest intercourse, seldom resort to them, unless when impelled by the strong motives of interest or necessity.

The visible signs have a much stronger claim to our notice ; they are of a more elevated nature ; are more numerous, distinct, and varied ; and, independent of their elegance and beauty, are better calculated to express the modifications of sentiment. They surpass all others in conveying intelligence to a distance ; and, owing to the sense by which they are discerned, their entering in groups produces no confusion in perception. The eye, which receives them, marks instantaneously the boundaries of

the whole; assigns to each its relative situation, its colour, its form, and its proportion; performing its office with singular dispatch, and in general with accuracy.

If visible signs be not therefore commonly used as a language, the fault is not in the organs of vision; like those of smell, taste, and of touch, they are not sufficiently subjected to our power; we cannot collect, transport, nor appropriate them at pleasure; we cannot imitate them without much labour and study; and even when the power of imitation is acquired, we cannot separate, combine, and vary the number, the colour, the form, and proportions of their different pictures, readily and with ease.—Gestures, indeed, are natural expressions, but fatiguing and tiresome; depend too much on feeling, on fancy, or the art of mimicry; and would be, even in a Roscius or Garrick, too few in number, and too little susceptible of that variety which is requisite in language.—Another objection to visible signs is, that almost all of them, with the exception of those that

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are luminous, are imperceptible in the dark, and can only be useful during the day, or when artificial light is employed. For these reasons visible signs have been also rejected as a medium of intercourse in the more ordinary occurrences of life ; so that of the five species of signs, the audible only have been received into general use.

As physical causes, audible signs never produce, like odours and tastes, pain, nausea, or vomiting ; and seldom are so loud as to injure the organs to which they are addressed. They are not confined, like the tangible signs, to immediate contact ; and are not, like the visible, dependent on light ; at the same time no signs are more numerous, distinct, and varied, or so much under management. We possess even a system of organs constructed intentionally upon their account ; a system which imitates, creates, combines, separates, lengthens, shortens, raises, lowers, and varies them at pleasure ; a system which, through nervous communications, is made subservient, and in some measure

obedient, to the ear ; and a system, therefore, which is prompt to furnish it, not only with the objects of its perception, but to furnish them likewise of any kind, and in any order, arrangement, or variety that suits its taste. Nay, what is more, the hands and the feet, which under its directions produce sounds in rythmus and measure, would, in cases of necessity, prove no imperfect instruments of its language ; but very seldom has it occasion for their assistance. Its vocal organs are fully adequate for every kind of audible expression ; while the power it has of thus procuring sounds at its pleasure, does not prevent it from deriving much curious information from the sounds emitted by various objects dispersed throughout Nature. By these it is often able to distinguish the species of an animal, its passions, and its feelings ; by these it often distinguishes likewise the mineral and vegetable ; and by attending to their nicer shades and varieties of tone, minute differences, that depend on singular and abstruse properties. We then need not wonder that the  
ear,

ear, possessing such superior advantages, should form a language more copious, varied, and extensive, than any addressed to the other senses.

EVEN WRITTEN LANGUAGE is the language of the ear ; none of its signs are directly and immediately the signs of our ideas, but the signs of sounds, to which our ideas are linked and associated. And here, might I venture on a bold figure, I would almost say that written languages are nothing more than the shadows of the vocal ; for while vocal languages are in that state which we call *living*, their written languages are observed to follow them step by step ; to assume their varying and Proteus forms ; and whether stationary, progressive, or retrograde, to undergo corresponding changes. Even the written language of China, which did originally, and does still, in a few cases, answer the purposes of a pictured language, is, upon the whole, more frequently employed as a symbol of speech : for allowing it to possess no fewer than 80,000 different characters, yet that number would be very insufficient to ex-



press all the varieties of historical occurrence, with the circumstances of time, place, and persons; and would still less be fitted to record the transient millions of fleeting generations, as they pass in succession from the cradle to the grave. Let us only consider, Where could each period of time, each lake, river, and mountain, and each individual of the human species, find a distinct and appropriate picture among 80,000, or even 180,000? The truth is, each picture stands for a word; and the same picture, like the same name, may answer a million. Nor need we here have recourse to hypothesis; we are positively assured that these characters have gradually become the symbols of sounds; that occasionally they are used like letters and syllables in spelling words\*; that they are made to express rhimes, and are read audibly, just as the written characters of Europe; with this difference, that, retaining something of their ancient privilege as pictured

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\* Vide Theophili Sigefridi Bayeri, *Museum Sinicum*, Petropoli editum, 1730. Vol. I. p. 116.



red characters, many of them, under a different name, continue to indicate the same thing in China and Japan.

Some, in tracing the progress of writing from pictures to letters, and endeavouring anxiously to fill up the gap, have, after labouring, and labouring in vain, supposed, that the last must have been the discovery of Divine Inspiration. This ancient fable of the Egyptians has misled numbers in their researches. If we look at the pictured records of Mexico\*, or ask how some of the native Americans write their subscriptions, we shall soon be convinced that most of their pictures represented sounds; that the picture of the flower, the plant, and the animal, stood for its name; and that if a man bore the name of the flower, the plant, or the animal, the picture of the object whose name he bore was made to represent him in writing, but distinguished by some particular mark, to show that it was not to be read literally. If he bore the name of two or three objects, all their pictures

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\* See Clavigero's History of Mexico.

pictures were joined together, and a word composed as of so many syllables. A similar practice is followed in China ; a great part of their primary words are monosyllabic. All of these syllables have pictures, or rather what were originally pictures; and when you mean to write a word of so many syllables, you have only to write the pictures of the syllables of which it is composed. Some of these syllables approach near to the elementary sounds of our alphabets; so that words are spelt and written in China by the mutilated fragments of the ancient pictures, nearly as we write and spell them in Europe by means of syllabic characters and letters.

The first step therefore in picture or iconographical writing was to make the figure stand for the name of what it represented; the second, to select those names which were monosyllabic, and out of their pictures to compose words; the third, to mark and recollect those names which approached near to elementary sounds, and out of their pictures to form syllables.

All these steps, doubtless, required much time, and a great deal of labour : But nations live for several centuries gradually improving ; and as every nation, in the least civilized, endeavours to preserve written records of some kind or other\*, the regular study, the steady perseverance, and united efforts of several thousands for successive generations in the business of state or affairs of commerce, must have done much in improving an art that was capable of improvement ; while lucky accidents occasionally occurring, and the fortunate thoughts of inventive geniuses, must at times have rapidly accelerated its progress until it arrived at something like perfection. Indeed it is almost impossible to conceive how pictured figures, significant of sounds, could have been prevented, in the hands of an ingenious and industrious

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\* Notwithstanding the tenets of the Druids, and their prohibition with regard to writing, Cæsar informs us, that the Greek letters were in certain cases used by the Gauls of particular provinces.

trious people, from ending gradually in some alphabet, literal or syllabic.

Those who are fond of traditionary stories, who ransack the fabulous records of antiquity to find out the inventors of love, of food, and of clothing, and who have discovered that beasts and birds were among the contrivers of our arts and manufactures, will not be pleased to find that writing should thus have a kind of natural origin. Even speech itself, though the Author of Nature has generously bestowed organs for the purpose, given us a strong inclination to use them, and an ear to listen to the sounds which they utter, would never, in their opinion, have existed unless for some particular revelation ; for it does not follow in their way of reasoning, that although a man may chance to have gotten a brain and a stomach, hands and feet, and a number of senses, he therefore should know, without being told, what are their natural and appropriate functions.

If writing, they will say, be a human invention, how comes it that all alphabets seem to be  
derived

derived from a common origin? Should not each nation, on that hypothesis, have formed a distinct alphabet for itself? It certainly should, and would actually have done so, had it tried the experiment, and not been anticipated in the discovery by one more enlightened and early civilized. But granting that each had invented an alphabet, and several nations lay claim to the honour, the elementary sounds of their characters would have been very nearly the same; and to an antiquarian or etymologist might appear to have sprung from a common source: for it is very seldom considered that ten or a dozen radically distinct elementary sounds constitute all the syllables of language; that these syllables are necessarily limited to a few hundreds; and, excluding varieties, are found to be the same in every Dictionary of whatever country. The general resemblances arise from causes that are unavoidable; but too often classed with those that are arbitrary, to favour the ideas of learned antiquarians and etymologists in tracing the origin of nations, languages, and customs.

CHAP.



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CHAP. II.ON THE CHANGES OF LANGUAGE.

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HAVING shown the close and intimate connection between a *spoken* and a *written* language, and mentioned that both are subject to changes, it becomes a sort of necessary precaution, in proposing terms for a nomenclature, to inquire into the causes of such changes, and to prevent as much as possible their operation upon the terms of which we make choice. That such changes are daily, insensibly, and gradually taking place, is a fact too generally acknowledged to require proof; and writers of taste, who value themselves upon the beauty and elegance of their diction, must often reflect, with painful apprehension, on the instability and transient nature of the perishing sounds with which their literary fame is connected. But  
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however great their apprehensions may be, the effects which they dread cannot be prevented.

New climes, produce, employments, must necessarily suggest new ideas; of new ideas, the necessary consequence is new words, or the old taken in a new sense; of new words, or a new sense, another consequence is, a new phraseology; in a new phraseology, caprice and fashion, the pride of innovation, the desire of improvement, colloquial inaccuracies, with other causes; such as the varieties which commerce, conquest, and intercourse with foreigners bring in their train—must all affect the stability of language, and vary the action of the vocal organs.

Yet, independent of all these causes, language, besides, has the seeds of change in its very nature; each individual has a voice of his own, and a manner of speaking that distinguishes him from others; and this difference would be still more conspicuous, were it not for the influence of imitation. This imitation, where all are aiming at the same original,

ginal, preserves a sort of general resemblance in the varied language of the individuals of the same nation. But where each has not access to the general standard, and where most are obliged to take copies for their model, the language separates, almost irresistibly, into different dialects; and each province, or each group into which the several inhabitants are classed, acquires a tone, accent, and manner peculiar to itself: or should the province become independent, and all its connection with the nation be dissolved, its dialect hastens to assume the form of a different language. So strong is this tendency to change, that in many provinces of no great extent their dialects are subdivided into dialects; each district, village, and hamlet, secluded from a regular and frequent intercourse, exhibits some peculiarities of speech; and would seemingly in time, if intercourse were stopt, acquire a distinct language of its own.

What can be the cause of all these changes, where nothing appears to induce them from  
without?

without? If any choose to investigate the matter, he will find it in the number, the varied structure, the diversified functions, and complex movements of the organs employed to produce and articulate the human voice.

It is well known that the more complex any piece of machinery is, whether the work of nature or of art, the more it is exposed to varied action, deviation, and error. Apply this observation to the vocal muscles, and in one sense their number is not great; but if we consider the various combinations of which they are capable, and the varied effects which they produce, their singular powers must appear astonishing to those not acquainted with their compound action. Of this action the ordinary books written on the subject scarcely afford any idea. They seem to imply, that a muscle only acts by itself, in conjunction with its fellow, or against an antagonist: And the young anatomist, after studying for months, and sometimes for years, one of the most curious pieces of mechanism to be found in Nature, and after

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fondly flattering himself that he knows every thing interesting or useful in the animal system, is seldom able to explain satisfactorily a single movement of his own body, or of any of its limbs.

Suppose that A, B are two muscles forming a pair, he is told that A and B perform each a separate movement, and that AB acting together perform a third. This is nearly all that he learns concerning the functions of a muscle and its fellow; but this is a very imperfect idea of the part which they generally act in the system. If another muscle, as C, had been added, the number of movements would have been seven; and a

1	A
2	B
3	Ba
4	C
5	Ca
6	Cb
7	Cab
8	D
9	Da
10	Db
11	Dab
12	Dc
13	Dca
14	Dcb
15	Dcab

fourth muscle, as D, would have raised the number to fifteen. Thus every additional muscle, besides giving a separate movement, may double the number of all the preceding whenever the part to which they are attached is capable

pable of moving in every direction.—Where indeed it is limited to the two motions of flexion and extenſion, it can vary only the force and the velocity ;—but, again, where a number of moveable parts conſtitutes an organ deſtined to ſome particular function, and where this function is varied and modified by every change in the relative ſituation of the moveable parts, it muſt be evident that the number of changes producible on the organ muſt equal at leaſt the number of muſcles and all the combinations into which they can enter.

*The following TABLE will show the specific and distinct Movements which, independent of Varieties, are producible by any number of Muscles, from 1 to 50.*

1	1
2	3
3	7
4	15
5	31
6	63
7	127
8	255
9	511
10	1023
11	2047
12	4095
13	8191
14	16383
15	32767
16	65535
17	131071
18	262143
19	524287
20	1048575
21	2097151
22	4194303
23	8388607
24	16777215
25	33554431



TABLE *continued.*

26	.....	67108863
27	.....	134217727
28	.....	268435455
29	.....	536870911
30	.....	1073741823
31	.....	2147483647
32	.....	4294967295
33	.....	8589934591
34	.....	17179869183
35	.....	34359738367
36	.....	68719476735
37	.....	137438953471
38	.....	274877906943
39	.....	549755813887
40	.....	1099511627775
41	.....	2199023255551
42	.....	4398046511103
43	.....	8796093022207
44	.....	17592186044415
45	.....	35184372088831
46	.....	70368744177663
47	.....	140737488355327
48	.....	281474976710655
49	.....	562949953421311
50	.....	1125899906842623

On these principles, which can hardly be denied, let us here try to form some idea of the number of changes of which the organs of voice are susceptible. The muscles proper to the five cartilages of the larynx, supposing the transverse and oblique arytenoid to constitute but one, are seven pairs\*. Now fourteen muscles, that can act separately or in pairs, in combination with the whole, or with any two or more of the rest, are capable of producing 16,383 different movements; not reckoning as changes the various degrees of force and velocity, nor the infinitely varied order of succession by which they may occasionally be brought into action. The number appears almost incredible; but to lessen the surprise, it must be recollected that I speak not here of the powers possessed by any individual,

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\* Cricothyroideus, Cricoarytenoideus posticus, Cricoarytenoideus lateralis, Thyreoarytenoideus, Arytenoideus obliquus, Arytenoideus transversus, Thyreoepiglottideus, Arytenoepiglottideus.

vidual, which will depend on habits and circumstances, but of the powers of the vocal organs, considered in the abstract, free from all the influence of custom, equally indifferent, and equally disposed to act in any order of succession, in any combination, and with any degree of force and velocity of which their original powers were susceptible.

If the powers I have mentioned appear astonishing, and able to account for many thousands of those varieties observed among the voices of the human species, I have further to add, that the muscles alluded to are only the proper muscles of the larynx, or the muscles restricted in their attachments to its five cartilages. These are but a few of the muscles of voice. In speaking we use a great many more. Fifteen pairs \* of different muscles, attached to

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\* Sternohyoidei, Omohyoidei, Sternothyroidei, Thyrohyoidei, Stylohyoidei, Mylohyoidei, Geniohyoidei, Digastrics, Geniohyoglossi, Stylopharyngei, Palatopharyngei, Crico-

the cartilages, or os hyoides, and acting as agents, antagonists, or directors, are constantly employed in preserving the cartilages of the larynx steady, in regulating the place of their situation, or moving them as occasion requires, upwards and downwards, backwards and forwards, and in every way, directly and obliquely, according to the course of the muscular fibres, or in the diagonal between different forces. These muscles, independent of the former, are susceptible of 1,073,741,823 different combinations; and co-operating with the seven pairs of the larynx, of 17,592,186,044,415, exclusive of the changes which must arise from the different degrees of force and velocity, and the infinitely varied order of succession in which they may be brought into action.

But these are not all that co-operate with the larynx, either in forming or changing the voice: the diaphragm, the abdominal muscles, the

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- Cricopharyngei, Thyropharyngei, Syndesmopharyngei, Mylopharyngei.

the intercostals, and all that directly or indirectly act on the air, or on the parts to which the chondral and hyoidal muscles are attached, contribute their share. The os hyoides could not be raised unless the inferior maxillary bone were previously fixed by the temporals, masseters, and internal pterygoids; and a similar assistance is likewise furnished by several other auxiliary muscles that fix the head, sternum, and scapula; to these we must add some pairs belonging to the pharynx and isthmus faucium, and some also belonging to the tongue; which, combining with others, give to that organ an inconceivable variety of movement; and so quickly that, in rapid utterance, they change its state three thousand times in the space of a minute\*.

Yet all these muscles, whether they assist to inspire or expire, to enlarge or diminish the cavity of the pharynx, to shorten, lengthen, to relax

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\* Haller articulated 1500 letters in a minute, which necessarily required 1500 contractions and as many relaxations of the lingual muscles.



relax or render tense the trachea, to change or fix the situation of the larynx, to alter the relative position of its cartilages, to enlarge or diminish the aperture of the glottis, to give the necessary tension to its ligaments, or articulate the voice as it passes through the mouth—can neither separately, nor in combination, produce an audible impulse on the air without a certain degree of elasticity and vibratory motion of the trachea, laryngeal cartilages, and glottal ligaments. Now this elasticity, though it partly depend on the action of the muscles, yet it partly depends, at the same time, as we learn from catarrh, on the state of the membranes and glandular secretions, and partly, too, as we also learn, from some other cases on the state of the larynx and of the trachea; and suppose these, as well as the muscles, were perfectly fitted to perform their functions, and to produce the audible impulse, yet this impulse is apt to be varied by the state of the nose, fauces, and palate, as we learn from several of their morbid affections. Probably, too, by the size and form of the frontal  
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sphenoidal and maxillary antres; and most certainly by the secretion, or rather absorption of the feminal fluid, as we may see in the consequences of castration.

Another source of this species of variety is the ear, which superintends and directs the whole of the vocal system, and without which the voice would be constantly harsh and unharmonious, as may be observed in the speech of the deaf. To the ear we must add the several passions, each of which lays claim to peculiar tones and cadences and to modes of utterance, differing widely in loudness and rapidity, and in many other specific varieties not easily described.

If we turn our attention to the manner in which the voice is articulated, we shall find still more sources of variety; we shall find that, besides the tongue, the pendulous velum of the palate, the palate itself, the alveolar processes, the teeth, and the lips, are all concerned in the pronunciation of words; and if we examine the human lips, compare them with those of inferior animals, observe  
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their free and extensive motion, with their numerous muscles\*, capable of entering into 524,287 different combinations, we can hardly avoid being of opinion that the human lips, besides being calculated to answer a variety of other purposes, were also intended by the Author of Nature to be organs of speech.

I have no doubt that here the reader's surprise will recur at this immense variety of power in the vocal organs; and more particularly when he reflects that the number of positions which they produce is infinitely greater than that of their movements†. But however great his wonder may be, he will surely recollect that these combinations are not deduced from speculative opinions, but by fair calculation from facts that are acknowledged; and that having no intention whatever to excite any thing

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\* Levator anguli oris, Levator labii superioris, Depressor labii superioris, Depressor labii inferioris, Depressor anguli oris, Levator labii inferioris, Zygomaticus major, Zygomaticus minor, Buccinator, Orbicularis.

† See Introduction, p. 20, 21.

thing like marvelling astonishment, I have purposely omitted the incalculable varieties that necessarily result from the degrees of force and velocity, and the infinitely varied order of succession in which the muscles may be brought into action. He may assert, and assert with justice, that no individual of the human species can throw his muscles into one thousandth part of the combinations of which I have supposed them susceptible. But he should remember at the same time, that this reasoning, as has been acknowledged, was never intended to show what are the effects of muscles in particular persons, but to show their capacity and original powers; and from what an exhaustless fund of variety in tone and voice they are able to furnish each individual of the countless millions of successive generations with characteristic marks of distinction.

Perhaps even in the single individual the combinations of the vocal muscles are more numerous, and more obvious than is generally believed. Who, from theory, would have ventured

tured to predict, what now is a well authenticated fact, that the deaf, by attention, may learn to speak, and distinguish all the words of a language by their visible changes in the organs of voice? Who that has felt the varied and powerful expressions of the eyes, would have imagined that such a number could have been produced by a few muscles? and, Who has not wondered, and wondered again, at the varied appearances of all the passions, and of all their shades, in the countenance of a Garrick? And yet all these instances must fall short of conveying even the most distant idea of the powers I allude to.

To form any thing like an adequate notion of the singular contrivance of the muscular system, and of the movements of which it is capable, we must not confine our examinations to what is exhibited in two or three particular persons; we must recollect that all the muscles are living powers; that in early life they are apt to contract habits with facility, and afterwards to retain them with such inveteracy as  
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to be incapable of any exertion inconsistent with those in which the previous habits had been formed. We see this daily exemplified in the uses of the right and left arm; and may often observe, that those who have long been accustomed to one language find it difficult, and sometimes impossible, to articulate properly the sounds of another. In these cases we see the muscles inactive from disuse, or fettered under the constraints of habit; the habit, too, of particular situations. In such circumstances, it is impossible they can furnish a criterion of what had been their primary powers. To form a just estimate of these, we must look back to the more early periods of life, view them in every diversity of shade, in every person, in every situation, constitution, and climate; we shall then find that whatever these be in the adult, they were very different at the commencement of life's career.

All children acquire the tones, accents, and articulations of those countries in which they are educated; an evident proof that, prior to  
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the formation of habits, the vocal muscles may be brought to act in any one of the numerous millions of combinations that have ever been adopted by any tribe, family, or nation of the human race, and be made to acquire the habit of pronouncing with readiness and ease any one of the almost infinite variety of languages that have been, that are, or that ever shall be, on the face of the globe. Even this wonderful diversity of power is daily presented to our observation; for when we consider that the muscular system is, with the exception of a very few trifling varieties, nearly the same in all individuals, having the number, form, structure, situation, direction, and attachment of its muscles in every instance, regular and uniform—we must certainly conclude that, unlike to any thing we have ever seen, it has the power of diversifying its actions in a most extraordinary and uncommon manner; and when we see it exhibit the strongly marked and peculiar differences in the features of the countenance, in the voice, the gait, and the handwriting



writing of each individual in the countless millions of passing generations; when we see it the organ in all their different species of exercise, and every exercise like their tone of voice marked by some discriminating character; in short, when we see the number, variety, the strength, the velocity, and continuance of its motions, in some of the more remarkable cases of running, leaping, dancing, riding, fencing, wrestling, vaulting, tumbling, balancing the body, and performing feats of legerdemain—in the name of wonder, what must we think! We must surely think, with the credulous and vulgar, that it is assisted by the power of magic; or, with the more enlightened and considerate, that it possesses powers and resources, of which, after all our study and inquiry, we are still ignorant.

With respect to characteristic distinctions, I have mentioned several sources of variety in the tone and articulation of voice, besides muscles; but suppose that muscles, acting as motors, fixors, antagonists, or directors, were the only

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source, and that these muscles were 50 in number, although I have enumerated 63, exclusive of others which might have been named, these 50 muscles are capable of entering into 1,125,899,906,842,623 combinations, and the numerous effects of these combinations may be infinitely diversified by the various degrees of force and velocity, and the orders of succession in which they are formed—is it likely, then, that, amidst this countless and almost inconceivable variety, any two individuals should often, or naturally, adopt exactly the same combination, bring their muscles to act in the same order of succession, or employ them with the same force and velocity in uttering sound or articulating words? I should think not. Even that mimicry of the tone and voice, which extends only to the general outlines or prominent characters, is very rare, and would seldom deceive an ordinary ear, if previously warned or allowed time to make the comparison and to discriminate. The muscles of the hand are but few in number; and yet what immense difficulty

difficulty and labour does it cost many to counterfeit the hand-writing of another.

It seems to be owing to the constant operation of such causes, whose influence can neither be checked nor prevented, that no accident ever has occurred, no art ever been discovered, to preserve the stability of vocal language, to calm the forebodings of literary geniuses, and remove the apprehensions that their laboured eloquence in a few centuries must require an interpreter, and the beauties of their diction pass unnoticed without a commentator. In our own country classical standards have been established, their excellency acknowledged, their elegance defined, a variety of expression copiously supplied, dictionaries compiled, senses determined, pronunciation ascertained, but without hopes or a prospect of success. No nation at this day can speak the language of its distant ancestry; and the language of Ossian, were it now extant, we have reason to believe would be as different from the modern Gaelic as the Gaelic from the Welch, or

either of the two from the parent Celtic. The languages of the Bible, Bedas, and Koran, are all dead, though millions were concerned in their preservation, and employed officially to keep them alive\*.

\* The preternatural interposition of Heaven therefore to divide language into different dialects, does not appear to have ever been necessary; and the passage of Scripture where that fact seems to be asserted, I should rather imagine is misunderstood.

Delighted with the beauty of the plains of Shinar, mankind there, as the Scripture informs us, had projected a scheme of building a capital, and preventing their dispersion. Nor had this thought originated with one; all were equally enamoured of the fancy, and bent on the design; every one was spurring another, saying go to, let us make bricks, let us burn them thoroughly. As the object was popular, and the zeal universal, all of them spoke of it *achadim dabrim, mia phone\**, *cisdem verbis*, in the same words; in short, at the time the whole earth, or the men that were in it, had but *sapé achat, cheilos en†, unum os*, or but one voice concerning the matter. And yet as nothing was then so

opposite

\* אחרים דברים, אחים דברים.

† שפה אחת, χολος εν.

opposite to Heaven's intention as their living together ; as luxury on the one hand, and oppression on the other ; as sedentary labour and debauched lives would all have been the consequence of an opulent city ; and as all these events, had they taken place, with their firm resolution not to be dispersed, would have been dangerous in a high degree to a rapid population—the Almighty, in his wisdom, saw it expedient to reprobate their conduct, and frustrate their intentions. With this view he descended from heaven—he threw confusion into all their counsels ; in scriptural phrase, he confounded their language ; or, using its metaphor, to sow dissension, *peleg lefunim*\*, he divided their tongues.

\* פלג לשונם, Pl. lv. 9. he divided their opinions ; for, to speak with the one mouth, is to be of the same opinion or sentiments, or, as our translators choose to express it, of one accord. See Josh. ix. 2.



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### CHAP. III.

TECHNICAL LANGUAGE SHOULD BE DISTINCT  
FROM THE LANGUAGE OF THE PEOPLE.

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FROM the preceding observations upon language, the following inferences may naturally be drawn: That the language of science, if meant to be either permanent or general, should be distinct from the language of the country ;—that it should not be entrusted to the management of the ear, whose taste is variable ; nor its fate committed to the organs of voice, which, varied and irregular in their own actions, are at all times under its influence ;—that it should be a language primarily or principally addressed to the eye, which has, not like the ear, the same power of new-modelling and changing its objects ;—and should be a language

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constructed on purpose, or a written language, whose vocal archetype is already dead, and no longer capable of creating disturbance or innovation:—in short, a language as much as possible placed beyond the vortex of fashion and the reach of change; where the strained analogies of simile and metaphor, or other forced and unnatural applications, have little chance of rendering it vague.

Some have imagined that a written language, constructed on purpose, would be preferable to any of our dead languages; but in what respect is not easily demonstrated. In all languages where sciences are treated, it is acknowledged that there are, or ought to be, two kinds of terms, perfectly distinct; one adapted to general use, and the other divided into many species peculiarly appropriated to the purposes of science. The part adapted to general use cannot possibly have a reference to any particular species of science, as every science must have a separate language of its own; nor can it have a reference to the sciences at

large, and therefore must be equally indifferent to all of them. It is true indeed, if a general language, artificially constructed, were generally adopted, and generally understood, it might save the trouble and prevent the errors arising from translation; but not more so than a dead language, generally adopted with a similar view. At the same time, neither one nor the other would compensate for the ease with which we write in our own language; nor for the precision, clearness, and readiness with which we perceive the force of its expression. It is therefore sufficient in every science that its technical terms should be kept distinct from the language which is spoken; that all its terms should have a certain and determinate meaning, should remain unaltered in every translation, and should be the same in every country where the science is either known or cultivated. With respect to the origin of such terms, it will be indifferent whether they be mere upstarts of yesterday, or lineal descendants from the ancient families of Pagan

Pagan antiquity ; only if descended in that way, they must not shine by a borrowed light, they must stand or fall by their own merit ; and should they be now in a different capacity from what they were formerly, their original consequence should entirely be forgotten. Every thing in science ought to be real, ingenuous, and open ; and every expression that indicates duplicity or equivocation, reservation, wavering, or inconsistency, is a reproach to it.

The Greek and Latin, the two dead languages most generally known, particularly in Europe, furnish most of the terms of our present nomenclatures. The only inconvenience of these terms is that, often being used in a secondary sense, which has a faint or distant analogy to the original, they are very apt to convey double meanings ; and thus create a confusion of ideas in those acquainted with their primary import. All, however, are not of this description. Many of them now have the same effect as arbitrary names ; and as for the rest,  
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when some time accustomed to their secondary meaning, we gradually forget that they ever had another.

In choosing terms, the taste, doubtless, may be consulted; though on no pretext should it be allowed to direct the judgment, and decide on matters of convenience and utility. In the choice and invention of new words, so far as respects the length and the sound, let it display its whole ingenuity; but where a nomenclature is already established, it ought to give place to a higher authority. In anatomy, for instance, it has no right from either its natural or acquired feelings to determine the questions, What are the terms that ought to be rejected? or, Whether those which we mean to retain ought to be derived all from the Greek, all from the Latin, or partly from both? It is one thing to form a new system of laws for an infant colony, and another to make a general reform in an ancient government.

If the words of only one of the languages were to be retained, we indeed might produce

a sort of uniformity to please the grammarian; but what is that to the anatomist? Will the dictates of reason or of common sense ever induce him to sacrifice his convenience and interest for such an object? and if he did, what idea must be formed of the mind that would leave serious and important studies to amuse itself in gazing at the shadows of antiquated words? for nothing besides the mere shadows of ancient vocables are in general to be expected among the terms of our nomenclatures. They may have something of a learned sound, but they cannot possibly retain much of a classical sense, when applied to objects of which the ancients were entirely ignorant.

The Greek and Latin are both sanctioned in our present nomenclature: to dispossess one of them entirely, would necessarily occasion the introduction of many new terms and the rejection of many old ones. Suppose for a moment that the change has taken place, and the question put, What improvements have we added to science, or what advantages have we acquired



red by it? Why the pleasure, and nothing but the pleasure, of seeing the terms of our nomenclature all derived from the same language. Our taste may be gratified, and we probably may feel something like his satisfaction who, regardless of the other qualities of his servants, is anxious only to have them all from the same country. His favourite object, such as it is, may be one that he would not easily renounce; but can it be the object of a wise man? And when he has got it, is it his reason or his humour that is gratified?

This species of motive, and I know no better for adhering strictly to one of the languages of our present nomenclature, can have little influence on a cool reflecting philosophic mind. He who considers the fluctuating nature of vocal language, will not pay a high deference to words, either on account of the age or the country in which they have flourished; and he who is eager in the pursuits of science, will seldom enquire whether they have come from Athens or Rome: he will cheerfully welcome



come the natives of both, provided that, by their united assistance, he is brought more safely or more expeditiously to the end of his journey. I should therefore be inclined, notwithstanding the opprobrium attached by some to certain connections and intermarriages among harmless vocables, not to reject the co-operation of the two languages in any form, where experience shows it to be convenient, useful, or necessary.

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CHAP. IV.THE TECHNICAL LANGUAGE OF ANATOMY,  
HOW TO BE IMPROVED.

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FROM the above preliminary discussions upon languages in general and nomenclatures, we proceed now to the more immediate subject of the Essay, the NOMENCLATURE OF ANATOMY. In this nomenclature we mean to propose some alterations; but as every alteration is not an improvement, it becomes a fair and reasonable question, What is to be their nature and object, and what advantages are likely to arise from the execution of such a design?

On the coolest and most impartial inquiry, it appears that many of the present terms convey false or erroneous ideas;—that many are superfluous, and of the superfluous many super-numerary;

numerary;—that many allude to antiquated names, which are but seldom or no longer used;—that many have a vague indeterminate meaning, and are consequently used in various senses;—and that several parts have received names, while those wholes of which they are parts have received none. From this view it has been supposed, that were the falsehoods and errors corrected, the superfluities retrenched, the troublesome and unnecessary allusions dropt, the ambiguities removed, and the several deficiencies properly supplied, the nomenclature would not only be improved, but the study of anatomy greatly facilitated.

As confused expression is too often a natural consequence of confused ideas, so ambiguities, in the language of science, may often be traced to the want of a clear and distinct arrangement. And should it afterwards be found that several vague terms in anatomy derive their origin from this source, a new and improved classification, where the circumstances require it, will also, it is thought, be attended with advantage,

It was certainly the clear arrangement of Linnæus, comparatively speaking, that enabled him to give such precision to his language; and that precision has greatly contributed to promote the science, as being a sure and unerring guide to the different objects which it presented; objects which, in consequence of his arrangement, have received a definite and fixed station, where the studious inquirer may readily find it. For this purpose Linnæus arranged them into different groups, which he called classes; subdividing these classes into orders, the orders into genera, and the genera into species; always taking care that those belonging to the same class should have one or more properties in common, those belonging to the same order two or more, those of the same genus three or more, and those of the same species four or more. To each of these groups, which were comparatively few in number, he gave names, annexing a short description of the characters by which they were distinguished. It was by adopting a si-

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milar method that Lavoisier improved the science of chemistry; and therefore it is surely an error to suppose that these two celebrated men confined themselves merely to changes upon language. Their merits were of a superior kind. A change of nomenclature, had that been all, would, by introducing a new set of terms, have only retarded the progress of science. Their classification was that which advanced it: it collected the scattered materials together, exhibited the whole in a state of connection, brought them within the sphere of our vision, and placed them at once under the eye in a proper light; while their nomenclatures served as mediums through which they were seen more clearly and distinctly; or rather were a kind of symbolical pictures, representing to the mind the state of the sciences, with the changes or improvements that had been introduced.

From viewing the rapid progress of chemistry that followed immediately on the change of its language, some have been led to consider the two



as cause and effect ; overlooking those important discoveries to which the science was principally indebted for its advancement, and even mistaking the merits of Lavoisier in those labours for which he is celebrated. The genius of this illustrious person was attracted chiefly by the great and the sublime : he felt little pleasure in partial remarks, or in noting minutely the insulated phenomena that take place in the dark corners of a laboratory. As his mind led him to general observations, and to be delighted with extensive views, it embraced in its wide comprehensive grasp a variety of objects, saw at a glance their agreements and discordancies, arranged them in a clear and luminous order, and thence drew conclusions that shot light through every department of chemical science hidden or remote.

From what he had observed, he believed that empyreal or vital air was the cause of acidity in all bodies, and he named it *oxygen* ; he saw that oxygen entered into various compounds with metals, and gave to these compounds



pounds the title of *oxides*. Directing his attention to the acids which it forms, he found them more numerous than had been supposed; distinguished each by a certain change on the name of the substance from which it was obtained; saw many of them widely diffused over Nature, and everywhere entering into various compounds with the several metals, alkalies, and earths—to these compounds he gave no general or common name denoting a class, like the word *oxide*; but according to the acid which they contained, arranged them into sulphats, nitrats, muriats, and so on. In these labours his classification and sublime discoveries were of more real consequence to chemistry than his nomenclature; and yet his nomenclature was not without its merits: It served to communicate the grand ideas which he had formed; and expressed them with a clearness, conciseness, and simplicity, that had not till then been witnessed in the science: it was happy particularly in the names of compounds, as sulphat, carbonat, or muriat of soda;

da; denoting at once the nature of the substances of which they were composed: and even went farther, attempting occasionally, as in the words *oxygen* and *hydrogen*, to convey a description in the appellations of simple substances.

The descriptive terms in this nomenclature have been much admired, and many have wished that the like were introduced into some of the other languages of science. With a view to this improvement, many of the present terms of anatomy have been condemned for not expressing some quality or circumstance of the objects which they signify, and others, containing a kind of short definition or description, been substituted for them. As it may be both wished and expected that the new terms brought into anatomy were all of this sort, a previous inquiry into their nature, uses, and peculiar advantages, will not be improper. The French have lately adopted such terms in their modern calendar: The words *nivose*, *pluviose*, and *thermidor*, are intended to show

show the species of weather which prevails at certain periods of the year. Let us see the improvement: The weather being variable even in France, and the rain and snow not happening to fall always at the time foretold in the calendar, these terms become so many lying predictions; and in countries where the seasons and climate are different, are an absurd unintelligible jargon. But what are the descriptive terms in anatomy? Not a great deal better. Many of these, as *sphenoides*, *etmoides*, *astragalus*, *cuboides*, which are founded on vague and remote analogies, scarcely convey the most distant idea of the forms which they were meant to express;—many which contain allusions to functions, and seem to communicate something of importance, deceive thousands of the indolent and credulous, who trust to their lame and imperfect information;—some, again, as *levator scapulae* and *supinator radii longus*, are almost unavoidable sources of error, from directly insinuating what is not true;—and some, as it were taking advantage of a partial and

erroneous classification, pretend to inform us of what belongs to this or that function, excluding, by a kind of secret reservation, some of the principal organs employed: this is evident in our distinction and arrangement of muscles into *flexors*, *extensors*, *pronators*, and *supinators*.—But by no means the least numerous class are those which allude to frivolous circumstances; some of which, like *fella turcica*, and the word *hippocampus*, seem intended to illustrate the things which we see, and which we may handle, by comparing them to objects which we either have not seen or have seldom an opportunity of observing. Much discernment, therefore, and caution are highly requisite in the use and application of such terms; for wherever their descriptions are frivolous or vague, or wherever they are false, whether founded on ignorance, error, or hypothesis, they can hardly fail, if used in their primary and original sense, to be hurtful to science: nay, even when true and accurately just, they cannot be admitted unless when concise; for be their descriptive powers what they will,

will, they become ridiculous when they run out to the length of sentences.

Are all such terms, then, to be rejected from the language of anatomy? and ought there to be a complete revolution in its nomenclature? To answer these questions, it may be observed, that no where perhaps is prudence more necessary than in our attempts to innovate on habits and established customs.—Those terms may surely be retained which are just and accurate, and not too long;—those which assist us in discriminating objects;—and those likewise, however absurd their original allusions, that, in course of time, have laid aside their primary sense, and begun to be used as arbitrary names. With respect to the last, the busy genealogist may sometimes be tracing them to what they have been; and should he not find them honourably connected, may endeavour to raise prejudices against them; but few who are deeply interested in science will pay much attention to his surmises. A genius for minute and accurate investigation is highly commendable,



and has frequently led to sublime speculations; but wherever it gets into a wrong path, and allows itself to be occupied with trifles, it becomes contemptible.

The learned philologist indeed may chace  
A panting syllable through time and space;  
Start it at home, and hunt it in the dark  
To Gaul, to Greece, and into Noah's ark \* :

But if his object be not of importance,

The solemn trifter, with his boasted skill,  
Toils much, and is a solemn trifter still †.

The words *inkborn*, *postborn*, *candlestick*, have all been retained in a sense different from the original; but since they have dropt that original meaning, they are found as expressive, and as seldom the causes of mistake, as any other words in the English language. Even in chemistry, the words *oxygen*, *hydrogen*, *azot*, are now used as arbitrary terms, and only with a few suggest an idea of Lavoisier's hypothesis.

Nor

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\* COWPER'S *Retirement*.

† COWPER'S *Charity*.



Nor is it perhaps difficult to explain how many words, from being descriptive, should thus become arbitrary. Suppose that five different persons saw each a different set of experiments on one of the gases whose name was unknown, and that each should afterwards explain to the rest what he had seen; it would be impossible for them to know that they all were describing but different phenomena of the same gas.

Suppose, again, that during the experiments each had been told that the gas was oxygen, the word *oxygen* would have with each a different meaning; and should it be afterwards pronounced in their presence, would serve as a signal of general rendezvous for all their ideas on the nature of the gas. Upon hearing the word *oxygen* pronounced, each would recal and marshal in his memory his quota of phenomena; every quota would differ from another, but every one of them would belong to oxygen; and they now would perceive, upon each relating what he had seen, that the properties and phenomena of this substance were

were more numerous than what any of them had previously imagined.

Suppose farther, that all its various properties and phenomena are known to the five, and that each now were desired to mention a few of the most obvious and characteristic, it is probable that each, if any room were left for selection, would mention those which had made the deepest and most lively impression on his own mind; an impression which evidently would depend upon taste, fancy, and judgment, and a variety of other circumstances, not easily enumerated. Allowing, however, the selection to be made, and that each were required to give to the gas a descriptive name alluding to the property which he conceived the most obvious and characteristic, every name would differ from another, all would be limited in their signification, and each pointing out a particular property exclusive of others; none of them would, while in that capacity, serve as a signal of general rendezvous for our ideas on the subject of oxygen.

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A descriptive name is therefore inferior, in certain cases, to an arbitrary name. The former recalls particular ideas, the latter makes no distinction whatever, but summons every idea on the subject; and when they are all collected together, arranged, and examined, presents us with a general view of the whole. From this it appears that the arbitrary name is the symbol of a class, genus, or species, which every one defines or describes according to the notions which he has collected from among the individuals; and that the descriptive is the symbol only of a certain character belonging to this class, genus, or species, which, when it discriminates concisely and accurately, is convenient and useful, but otherwise obtrudes the author's conceit, solicits our attention to some particular fancy or whim, and presumes to recommend it as the guide or the object of our researches.

If oxygen, hydrogen, and azot, exhibit a variety of different characters besides those implied in their names, every man, as well

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as Lavoisier, will feel he has a right to fix on his own marks of distinction, and will naturally prefer his own to another's: so that such words must at last be used in an arbitrary sense, or be laid aside; for no man in a matter of indifference will submit to the tyranny of being unnecessarily restricted in his choice. A descriptive word is somewhat like a picture: Now if a picture be meant for a likeness, it should either exhibit every character of the original, or at least those that are unavoidably obvious to all; for different persons will distinguish an object by different marks and different positions, and those will never discover the resemblance who see not the features by which they were wont to know the original; though others, accustomed to know it by the traits which the painter has copied, may be surprised at their want of penetration, and pronounce the figure an admirable likeness.

Indeed Lavoisier has not extended his descriptive language through the whole nomenclature; he has confined it to those substan-

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ces that in his time were but newly discovered, and to that part of chemical science where he found it necessary, for the sake of arrangement. Exclusive of a few of the simple substances, he has confined it to the combinations of oxygen with metals, and the combinations of acids with metals, alkalies, and earths. His partiality for these acids, the cause of whose distinguishing property he found to be oxygen, has made him divide the last combinations into sulphats, nitrats, muriats, and so on, as if the acids were so many species or modifications of the different metals, alkalies, and earths. Thus under *calx*, which signifies *lime*, we find the divisions to be sulphats, nitrats, muriats, acetats, &c.; instead of *calx vitriolata*, *nitrata*, *muriata*, *acetata*; the more simple and natural divisions of the ingenious ever memorable Bergman. Yet Lavoisier's method has also its advantages; and at this time of day, where no real inconvenience is felt, any alteration could only proceed from misguided ignorance, or a species of mania for nomenclaturing.

Linnæus,



Linnaeus, as well as Lavoisier, adopted a new classification; and the clusters or groups into which he has divided natural objects were, so far at least as arrangement is concerned, entirely a work of his own creation. These necessarily required new names; and these names are sometimes descriptive, expressing the characters by which the clusters or groups are distinguished; at the same time he gave new names to the individual objects which had none; fixed upon one particular name where there were many; rejected those which had double meanings; restricted the sense of those which were vague; and in short employed every precaution to avoid whatever in the nature of language tended to mislead, retard, or obstruct the studious mind in the progress of knowledge. Thro' the whole of this tedious and arduous task he was otherwise employed than in the puerile shifting of names with a view to improvement. To change one name for another was rather the business of a translator than a philosopher; and he seems not so much to have aimed at changing

ging the language of science, as at rendering it clear, concise, and accurate, by his lucid and correct mode of arrangement.

If we therefore imitate him and Lavoisier, a new set of terms in the language of anatomy will neither be our sole nor our principal object; we must likewise attend to that kind of classification which is best suited to the nature of the science, and is best calculated to give clearness, precision, and effect, to its nomenclature. Besides, as we often must have recourse to comparative anatomy to illustrate many of the human functions, we ought to contrive many, at least, of the general terms in such a way as to apply equally to man and the lower animals, from whom these illustrations are borrowed.

CHAP.

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## CHAP. IV.

### ON THE TERMS RELATING TO POSITION AND ASPECT.

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HAVING seen how much the essential merits of every nomenclature must depend on the previous arrangement of its objects, it may here be observed, for the sake of order, that the animal systems, for which we principally intend this nomenclature, are composed of a great variety of organs, differing in appearance, structure, and function; that these organs constitute so many subordinate systems, arranged under the various names of Bones, Muscles, Arteries, Veins, Lymphatics, Nerves, Organs of Respiration, Digestion, Generation, Sense, &c.; that subservient to these are different kinds of connecting substances which act as ligaments; different

rent kinds of secreting organs, which are called Glands; different kinds of membranous webs which envelope them; and a common covering of different layers, called the Integuments, which surrounds the whole.

As in a system so complex and varied, an accurate knowledge of situation and position must ever be a matter of the first importance, anatomists have long been in the practice of considering every organ as possessing eight different aspects, which point in as many different directions; *upwards, downwards, backwards, forwards, outwards, inwards, to the right, and to the left*; while the epithets usually employed to distinguish them are *superior, inferior, posterior, anterior, external, internal, right, and left*. Now as one or other of these terms happens to occur in almost every anatomical description, it is proper that they should be weighed and examined before we proceed to the names and arrangements of subordinate systems.

These terms, and most others which have a reference to the different aspects, are in every

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writer borrowed from the common language of the country, where they are used in a vague sense both in their literal and figurative acceptation. From the various directions, situations, and positions to which they are applied, not being accurately classed and defined, they are carelessly transferred, on the slightest analogy, from one to another, with scarcely any sort of discrimination. They may indeed be occasionally defined ; but, in general, what signifies a definition? No definition can easily break the strong association between them and their ideas ; an association which has been gradually forming for years, and which continues to be supported daily by the public sanction. Their ambiguous meaning will be constantly recurring whenever they are uttered ; and while that recurs, or is apt to recur, we may venture to say that they cannot with propriety be retained in anatomy. On this single objection alone they ought to be rejected ; but unfortunately there are others which are less surmountable, and which will appear on a more particular investigation.

SUPERIOR



## SUPERIOR AND INFERIOR.

THESE terms, in their primary sense, contain an allusion to the situation of different objects, as they stand with respect to the heavens and the earth ; and that they may regularly carry this allusion to the same parts in the language of anatomy, the body is supposed always to remain in the same position. The particular position which anatomists have chosen is the erect ; but this position being rather unnatural for the lower animals, we call in the assistance of fancy, and in spite of the senses set them bolt upright on the point of their tail, or their hind legs ; or, disregarding the primary sense of superior and inferior, we apply them, without any reference to aspect, to parts that correspond in form, use, or systematic connection.

## ANTERIOR AND POSTERIOR,

LIKE the last, suppose the erect position, and denote the parts before and behind. In the lower animals, when allowed to remain in their natural attitude, they signify the parts below and above ; and thus used as a sort of arbitrary terms, express corresponding parts of the system.

## EXTERNAL AND INTERNAL

ARE more vague than the preceding. The parts of generation are external or internal with respect to the general surface of the body.

The parts of an organ are external or internal with respect to the surface of the organ itself.

The angles of the eye are external and internal with respect to the lateral parts of the face and the middle superficial line that divides them.

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The parts of the leg are external and internal with respect to its surface, or with respect to the nearness and distance of the line that passes through the axis of the body. Thus all parts of the leg are external if superficial; and all parts likewise external, however deep, if they happen to be situated in what we express by the outer side.

While the arm is in a state of extension, and parallel to the trunk, the side next the trunk is internal; but as the radius rolls on its axis, it becomes a question, which is the side next to the trunk? The thumb, the palm, and the little finger, may in succession all assume that situation. Accordingly those who describe the hand in a state of pronation, make the thumb internal; those who describe it in a state of supination, make the finger external; while Albinus, preferring the middle position, makes the palm internal. Thus each of these words in the upper extremity, adding the sense superficial and deep, have no less than four different meanings; and three of these extended to the bones, muscles,

blood-vessels, and nerves. And as if the confusion were still incomplete, Innes, in describing the interossei, takes one of the senses, where he speaks of their origin ; and another, where he talks of their insertion.

### RIGHT AND LEFT

CAN never be applied with any propriety to parts of the extremities. As the right side of the one leg or arm corresponds in form, structure, and functions to what is the left side of the other ; they are therefore applied to the extremities only as wholes, and to parts of the viscera in the great venters, where they sometimes attempt to denote situation with little success, particularly when applied to the cardiac ventricles, sinuses, and auricles.

CHAP.

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CHAP. VI.NEW TERMS RELATING TO POSITION AND  
ASPECT.

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THE numerous mistakes that daily result from the ambiguity and frequent occurrence of these terms, is surely a reproach to our nomenclature ; and few will deny that they ought to be rejected if better ones could be substituted for them. With all submission to the judgment of others, I shall mention some which are certainly more determinate in meaning, and not more difficult in their application ; and as the TRUNK and EXTREMITIES seem to require different kinds, I shall begin with those for the trunk.



# TERMS FOR THE DIFFERENT ASPECTS OF THE TRUNK.

ANATOMISTS know that in describing the vertebral column, we call the bone which is nearest to the head the *ATLAS*, and the mass of vertebræ at the opposite extremity the *SACRUM*. In systematic connection these occupy corresponding regions in all animals in which they are found. Instead of the words *Superior* and *Inferior*, I would therefore propose *ATLANTAL* and *SACRAL*.

The breast and the back express likewise corresponding regions in all animals; and therefore, instead of *Anterior* and *Posterior*, we might adopt *STERNAL* and *DORSAL*.

When *External* and *Internal* signify what is superficial and deep, we might, in their place, employ the words *DERMAL* and *CENTRAL*, denoting what points to the skin and what to the centre: or if we happen to be speaking of an organ, *PERIPHERAL* and *CENTRAL*; the term *Peripheral*

*spherical* being derived from the Greek word that signifies “circumference.”

When they signify the side and middle of a surface, suppose a plane, to pass along the middle of the neck, the mediastinum, and linea alba, and to dividing the neck and the trunk into similar halves from the sternum to the dorsum, and let this plane be denominated MESION; LATERAL and MESIAL will in such a case convey the meaning of external and internal; and in many other cases, as we shall afterwards see by examples, be extremely useful in expressing both situation and direction.

The peculiar meanings of *External* and *Internal*, as they are applied to the extremities, will be better referred to their proper place.

As for the lateral parts of the trunk, *Right* and *Left* might still denote these; although, for the reasons already assigned in the general observations, DEXTRAL and SINISTRAL might perhaps be preferable; or should there be no occasion for distinction, as may sometimes happen, the word LATERAL may serve for both.

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It has already been noticed, that it is chiefly in describing the heart they are apt to convey an ambiguous meaning, and occasion trouble to the anatomist ; for what are called the *right* and *left ventricles* are strictly speaking neither right nor left ; and those who have chosen to call them rather *anterior* and *posterior* have employed terms equally vague ; and more erroneous if they be extended to comparative anatomy. To avoid the inaccuracies which must therefore arise from the use of such language, it should be remarked, that the vascular system in all the nobler species of animals may be divided into two parts, each consisting of veins and arteries. The one for conveying blood from the lungs to the system at large, and the other for conveying it again from the system back to the lungs. Let the vessels which convey it from the lungs to the system be called the **SYSTEMIC**, and those which convey it from the system to the lungs be named the **PULMONIC**, and all ambiguity will be avoided. Thus the pulmonary veins, the left sinus, auricle,

ricle, and ventricle, with the aorta and all its branches, will be *systemic*; while the bronchial veins, the veins of the head, heart, trunk, and extremities, the right sinus, auricle, and ventricle, with the pulmonary artery and all its branches, will be distinguished by the epithet *pulmonic*; and if it be necessary to mark their situation with respect to the trunk, or to one another in this or that species of animal, the terms already used for the trunk, as *atlantal*, *sacral*, *sternal*, *dorsal*, *dermal*, *central*, *dextral*, *sinistral*, *lateral*, and *mesial*, may conveniently be used for that purpose.

Besides removing much ambiguity, another advantage that naturally arises from this change in the nomenclature is, that instead of being obliged to enumerate the vessels in which the purple and in which the vermilion blood is contained, we may say at once that the purple is contained in all the *pulmonic* vessels, and the vermilion in all the *systemic*, whether veins or arteries; that those animals which have but one auricle and ventricle have no vena-pulmonic

nic system, or veins which carry blood to their lungs ; that their pulmonary vessels, in some measure, correspond in function to our bronchials ; and that their blood, undergoing a change from the action of the air, is entirely confined to systemic veins.

#### TERMS FOR THE ASPECTS OF THE EXTREMITIES.

IN describing the two kinds of extremities, we may naturally distinguish them by epithets borrowed from the regions of the trunk with which they are connected, calling the *Superior*, ATLANTAL, and the *Inferior*, SACRAL extremities.

In mentioning the ends of these extremities, or the ends of the bones of which they are composed, we may, with a reference to the course or direction of the extremity, denominate the end which is nearest to the trunk the PROXIMAL end, and that which is farthest from it the DISTAL. These last terms may be  
used



used as common in describing both kinds of extremities, and in distinguishing the ends of the coccyx and its different vertebræ. The other terms must be appropriate if they are to be borrowed from the names of the parts which constitute the two species of organs.

#### TERMS FOR THE ATLANTAL EXTREMITIES.

IN these extremities we may use the terms RADIAL and ULNAR to signify the two lateral parts, and with little hesitation; as these terms have already been adopted by the accurate Winflow and other anatomists of great eminence.

To the other two sides we may give the epithets ANCONAL and THENAL: The word *anconal* containing an allusion to that projecting point of the elbow which the ancient Athenians and modern anatomists have called *olecranon*; but which other Greeks denominated *ancon*, the name from which we derive the epithet belonging to the muscles called *anconeï*.

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The word *thenal* is taken from *thenar*, the Greek name for the palm of the hand: but here we transfer the word *thenar* to signify the flexure or side of the elbow opposed to the ancon; allowing the word *vola* to remain, and still to signify that part on the thenal side which is called the *palm*.

The aspects therefore of each atlantal extremity, and of all its parts from the scapula downwards, will be PROXIMAL and DISTAL, DERMAL, CENTRAL, ULNAR, and RADIAL, ANCONAL and THENAL; while the scapula, from its close and intimate connection, will have its aspects better expressed by the terms for the trunk.

#### TERMS FOR THE SACRAL EXTREMITIES.

THOSE parts in the sacral extremities which correspond in their general form, situation, and function, with the ulna, radius, thenar, and ancon of the other extremities, are the *tibia*,  
*fibula*,

*fibula*, *poples*, and *rotula*; and therefore, if we here preserve the analogy, the eight aspects of the sacral extremities will be PROXIMAL and DISTAL, DERMAL, CENTRAL, TIBIAL, FIBULAR, POPLITEAL and ROTULAR; allowing the word *planta* to remain, as we did *vola*, to express the sole on the popliteal side of the foot; and the large lateral bones of the pelvis to borrow their terms, as does the scapula, from the aspects of the trunk.

That the whole of these terms may be as generally useful as possible, they are meant to extend in their application as far as those for which they are substituted. Thus, for instance, in the ATLANTAL extremity, the humerus, and every bone to the points of the fingers, is supposed to have a *proximal* and *distal*, a *peripheral* and *central*, an *ulnar* and *radial*, a *thelal* and *anconal* aspect; while the relative situation of every nerve, muscle, and artery, is to be expressed by some one or other of these epithets. To illustrate my meaning by an example, I shall take the interossei muscles, which  
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are nothing more than the adductors and abductors of the fingers. Albinus calls those which appear on both sides of the hand the *external*, and those which appear on the palms only, the *internal*. Innes retains the distinction of Albinus with respect to the origin of these muscles; but when he speaks of their insertion, uses the words *external* and *internal* in a different sense to denote the lateral parts of the fingers. If the terms here proposed were adopted, these muscles, with respect to their origins, would be all either *anconal* or *thenal*, and with respect to their insertion *radial* or *ulnar*. Thus I would say, in speaking of their origins, that the two belonging to the forefinger are *thenal*; the two belonging to the middle finger, *anconal*; those belonging to the ring finger and little finger, alternately, *thenal* and *anconal*; the two *thenal* inserted into the *radial*, and the two *anconal* into the *ulnar* sides of these fingers. I have only to add, that the happy effects resulting from the partial use of such definite terms in Murray's Description of the Arteries,

teries, must make every one who is truly and seriously interested in anatomy extremely anxious to see them more generally employed.

THE *objections* started against these terms, if there be any, will, I conceive, be probably somewhat of the following nature.

The words *atlantal*, *sacral*, and *sternal*, allude to parts that are not to be found in those animals which have no vertebræ; and, besides, the allusion is not confined to the part itself, but extended to a sort of imaginary plane that is supposed to be in their vicinity. The answer is, that the parts occupy corresponding regions in all animals in which they are found; show where the planes are to be drawn; and that, instead of multiplying terms, and forming new and distinct nomenclatures for all the distinct classes of animals, it was thought better, where no ambiguity was to be dreaded, to give to the epithets borrowed from these parts a sort of general and arbitrary sense, and transfer them, by analogy, to all the corre-

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sponding regions of the system in every species.

The objection arising to the answer itself, that these terms, taken in a general and arbitrary sense, can no longer allude to the parts from which they are borrowed, is easily removed by causing a change in the termination, to show when they allude to the part, and when to the aspect.

Similar objections may likewise be made to the words *ulnar*, *radial*, *tibial*, *fibular*, *rotular*, and *popliteal*; and a similar answer may also be given: though this may be further said in their favour, that they have been adopted by other anatomists, particularly Chaussier; and if their use here be extended, it was to avoid the unnecessary multiplication of terms, and to preserve, as much as possible, simplicity, unity, and conciseness of arrangement, by limiting the number of general aspects to which the subordinate ones are referred.

The meaning of the words *anconal* and *the-nal* is likewise different from their primary meaning; but the language from which they  
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are borrowed is dead, and the primary meaning will have little chance of being suggested, along with that in which they are employed, to denote two aspects of the arm.

From the rotatory motions of the radius, and its varying positions with regard to the ulna in various cases, it may be difficult, in certain places, to distinguish the aspects when they happen to run in a spiral course; but though this difficulty may often occur, it may always be removed by ascertaining the different aspects at the joint of the elbow, when the radius is placed, or supposed to be placed, in a state of supination. From that point their spiral course may easily be followed in opposite directions both along the humerus and fore arm.

*Proximal* and *distal* are chosen in preference to *proximate* and *distant*, as being no parts of colloquial language; and likewise for the sake of their termination, as all the other words denoting *position* terminate either in *al* or *ar*.

*Central* is a word borrowed indeed from colloquial language; but here can occasion no am-

biguity, it being understood in the same latitude with the other terms.

As for the terms *peripheral*, *mesial*, and *dermal*, these, or words of a similar import, were absolutely necessary: but whether or not more agreeable sounds might have been gotten to express their senses, was a subject on which I have not bestowed very much inquiry.

HAVING now seen the defects of the terms denoting *position* in the trunk and extremities, and tried to remedy them, let us next see whether or not there be any defects in their expression when applied to the head. In the human species the word *superior*, in its primary sense, will allude to a part of the frontal bone, and that part of the parietals which lies near the sagittal future. It will likewise allude to similar parts in the sheep and ox, and some other quadrupeds; but were these quadrupeds to assume the erect posture, the parts that are *superior* would be *posterior*: and were man to assume the posture of the quadruped, the parts  
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that are *superior* would become *anterior*. *Superior* therefore, in these cases, denotes always, to a certain extent, similar parts, when the attitudes of the two species are different; and dissimilar parts, when they are the same. *Inferior*, on the contrary, similar parts, when the attitudes are the same; and dissimilar parts, when they are different: For, in the natural and ordinary posture of standing or walking, INFERIOR alludes to the basis of the cranium in the human species, but to the mouth and lips of these quadrupeds; yet both terms would signify a still greater variety were they farther extended to birds, fishes, reptiles, and insects. *Anterior* and *posterior*, at the same time, if thus extended, would be equally vague; while *external* and *internal* would be almost an endless source of ambiguity. But the force of this reasoning will appear more evident from the following Statement, where the terms are used in their primary sense, and applied to each species in its common attitude of moving or standing.

## SUPERIOR.

In man, part of the frontal and parietal bones.

In sheep and oxen, part of the frontal, parietal, and occipital bones.

In dogs and horses, part of the parietal and occipital bones.

In frogs, serpents, and various fishes, all the bones of the cranium and face which compose the plane opposite to the base.

## INFERIOR.

In man, the base of the lower maxillary bone, and the bones forming the base of the cranium.

In sheep and oxen, the middle part of the maxillary curves.

In dogs and horses, the same.

In frogs, serpents, and in various fishes, the base of the lower maxillary bone, and the bones



bones forming the base of the cranium.

#### ANTERIOR.

In man, the eyes, the middle part of the maxillary curves, and the bones of the face, opposed to the rising part of the occiput.

In oxen and sheep, the bones of the face, opposed to the base of the cranium and head.

In dogs and horses, the same.

In frogs, serpents, and in various fishes, the middle part of the maxillary curves.

#### POSTERIOR.

In man, part of the parietal and occipital bones.

In sheep, oxen, and most quadrupeds, excluding the amphibia, the base of the cranium.

In frogs, serpents, and in various fishes, the occiput.

## EXTERNAL AND INTERNAL

Are as faulty when applied in some of their senses to the regions of the head as they are in other parts of the system. What meaning, for instance, can we affix to the *external* and *internal* angle of the eye where the eye is round, where it is lateral, where it is vertical, or where the line passing from one angle to the other runs not transversely, but longitudinally with respect to the head?

FROM this statement it must be evident that the present terms for denoting *situation* will be attended with as much confusion in describing the head as any other part of the system; and that other terms ought to be employed, if we either wish to avoid ambiguity, or make use of general and precise language. At the same time, it will readily be granted, that if the terms already proposed for the trunk or extremities could, with any propriety, be extended

to

to the head, new terms would not only be unnecessary, but absurdly superfluous. But while anxious to avoid an improper multiplication of terms, we must recollect that two or three words, having each a definite and precise meaning, are not so troublesome and dangerous in science as one word with two or three meanings that are different; for every word employed to express two or three objects specifically different, must necessarily introduce a sort of confusion into our ideas; tend to mislead us in the paths of inquiry; and unless we are guarded, conduct us at last into the regions of ignorance and error. Forewarned, therefore, of the evils which arise from such redundancies in sense or expression, let us inquire whether any of the terms already suggested can be extended to the parts of the head. In doing this, it is needless to observe that those containing particular allusions to parts of the extremities must be ill adapted to express those of the cranium and face; and that, if we consider the position of the head in different animals,

mals, we must instantly perceive that *sternal*, *dorsal*, *atlantal*, and *sacral*, can do no more than mark the relative situation of parts, or the different positions of the head and trunk with respect to one another. But as even this may be an object of some importance; as it may introduce into our descriptions a greater degree of clearness and precision; and lead to conclusions in physiology that may be both interesting and useful—I shall here show the manner in which the application of such terms may be extended; and shall take first, in the way of illustration,

#### ATLANTAL AND SACRAL.

IN applying these terms to the head, let us call the line which follows the direction of the vertebral column from the sacrum to the atlas the VERTEBRAL LINE; and suppose it continued perpendicular to the plane of the foramen magnum till it fall on some bone of the cranium

or

or face. Let this bone, whatever it be, in that case be called the *atlantal*; we shall find, on inquiry, that the parietal bones will be *atlantal* in one species, the *frontal* in another, and some different bone in a third; that the angle formed between this bone and the vertebral line will vary considerably in different animals; and that when the line happens to fall on the same bone, it will often fall on a different part in a different species. In man, for instance, it will fall on the sagittal, a little behind the coronal suture: in all other animals it will fall more towards the face. In the ape, it will fall on the frontal bone, a little before the coronal suture; in the dog and horse, as far down as the orbitary ridge; in the mole, the rat, and some other quadrupeds, it will strike on some part of the nose; in frogs and serpents, will descend as low as the maxillary curves; and in some animals may pass obliquely from above downwards through the basis of the head.

If the term *sacral* be applied to the head, it must always denote that side which is opposed  
to



to the *atlantal*, and may easily be found from observing the place of the foramen magnum, which in all cases must be necessarily *sacral*. The situation of the sacral side will therefore vary with the foramen, which in human skulls is found in the base ; but as we descend thro' quadrupeds and birds, proceeds backwards, till in serpents and fishes we find it at that part of the head which is opposite to the mouth or middle part of the maxillary curves. In short, it recedes more and more backwards, towards the one extremity of the head, as the vertebral line comes more and more forwards towards the other. From this fixed and mutual relation we may, from knowing the atlantal point, ascertain in some measure the situation of the foramen ; obtain some idea of the form of the head, of its relative position with regard to the trunk, of the most usual posture of the animal in motion ; and a variety of other circumstances that necessarily depend upon these distinctions.

STERNAL

## STERNAL AND DORSAL.

THESE terms, when applied to the head, will signify parts in the same plane, in planes parallel, or nearly parallel to the sternum and dorsum; and should the sternum and dorsum be parallel, these planes will always be *sternal* which are on the *sternal* side, and those *dorsal* which are on the *dorsal* side of the vertebral line.

In the human species the whole face bounded by the chin, the hairy scalp, and the two lateral parts of the head, will be *sternal*.—In sheep and oxen, when the head is in the usual position, with the base seemingly at right angles to the vertebral line, the maxillary curves only will be *sternal*.—But in serpents and frogs, the basis of the cranium will be found *sternal*, while the maxillary curves will become *atlantal*.

In the human species, the word *dorsal* will denote the rising part of the occipital bone and posterior part of the two parietals.—In  
sheep

sheep and oxen, not only a part of the occipital bone, but the upper part of the parietal arch, thro' its whole extent, from behind forwards, including a part of the frontal bone.—In serpents and frogs, not only the upper part of the cranium, but likewise most of the bones of the face, which are not on the sides or basis of the head.

It seems to be therefore a general law, that the parts of the head which are atlantal and sternal in man should, in descending through the lower animals, gradually approach more and more to the dorsal situation, and the parts which are sacral more and more to that which is sternal. From knowing therefore the parts of the head which are sternal and dorsal, we will be led to nearly the same general conclusions that we drew from the points *atlantal* and *sacral*; we will learn the relative position of the head with regard to the trunk, the situation of the foramen, the usual attitude of the animal in motion, the form of the cranium, and how far it deviates from the human shape. We  
may

may also acquire, in this way, some general idea of the nervous system. The proportion between the diameters of the cranium and foramen magnum is usually connected with the shape of the head and the situation of the foramen: from knowing therefore the shape and situation, we may form some idea of the relative proportion of the two diameters; and from knowing the proportion of the two diameters, we may know the proportion between the brain and the spinal marrow; and as the sagacity and vital energy seems to be regulated by this proportion, we hence may form pretty accurate conjectures with respect to the degree of the intellectual functions, the tenaciousness of life, and power of reproduction possessed by the animal.

But altho' the extension of these terms may be highly useful in many physiological deductions, they are not adapted to the separate anatomical description of the head. In the case of a description, the head, which consists of two parts, the cranium and face, necessarily requires

quires terms of its own, as well as the trunk and the extremities; and these terms might be borrowed from the bones, if it were possible in that way to make them precise. But, unfortunately, in the cranium there are no bones, not even the ethmoidal, entirely confined to one of its aspects; and the bones of the face vary so much in their form, proportion, and general appearance in different animals, that they are equally unfit for our purpose. We must therefore endeavour to contrive names for describing the aspects of the cranium and face, that contain no allusion to the situation of particular parts.

Taking the head as a whole, these aspects should be eight in number; but supposing the falx a *mesial* plane, dividing it into two similar halves, they will amount to nine; and by dividing it into cranium and face, a tenth may be necessary. But as *dermal*, *central*, *dextral*, *sinistral*, and *mesial*, are equally applicable to the head and trunk, we only require five that are new: two for the base and crown of the



the head, two for the hind and fore part of the cranium, and one for the face.

The base and crown of the head, which are opposite, may be called the **BASILAR** and **CORONAL** aspects.

Between these two and the lateral aspects there is a projecting part of the cranium behind, which the Romans called *occiput*, and the Greeks *inion*. The Greek word is preferable to the Latin, as it does not convey any allusion to the occipital bone, which is found in two different aspects, the *basilar*, and that which may now be called **INIAL**.

In the opposite extremity of the cranium, where the nasal bones are found connected with the os frontis, there is a part which some anatomists who have written in Latin have called *glabella*. This particular aspect of the cranium, the aspect which is always opposed to the *inion*, may be named **GLABELLAR**.

The part of the face which is placed at the greatest distance from the *inion*, following the course of a straight line, is in some animals a part of the inferior, in others a part of the su-

**K**

perior

perior maxillary bone, or in birds, of the mandibles which correspond to them, this distant part of the face, whatever that happens to be, may be called the *ANTINION*.

So that the ten aspects of the head will be the *DERMAL*, *CENTRAL*, and *MESIAL*, the *DEXTRAL* and *SINISTRAL*, the *CORONAL* and *BASILAR*, the *INIAL*, *ANTINIAL*, and the *GLABELLAR*.

Of the last seven, if lines be drawn between every two of the opposite aspects, they will constitute the four following diameters: The *DEXTRO-SINISTRAL*, the *CORONO-BASILAR*, the *INIO-GLABELLAR*, and the *INANTINIAL*\*. The two former may be taken at different places of the cranium, towards the *glabella*, where it has in general the least depth and the least breadth, and towards the *inion*, where the depth and breadth are usually greatest; the first behind the temporal processes of the os frontis; and the other opposite to the prominent parts of the parietals, or of the parietal, as in sheep, oxen, &c.

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\* *Inantinial*, a contraction for *Inio-antinial*.

&c. where the sagittal suture is found only in the os frontis, and where one bone supplies the place of the two parietals. In this way we shall have two *dextro-sinistral* and two *corono-basilar* diameters.

The measurement of these several diameters will shew the limits of varying proportion in the heads and craniums\* of the same species; and when applied to comparative anatomy, will discover a number of specific differences as we descend in the scale of being. The *inio glabellar*, the two *corono-basilar*, and the two *dextro-sinistral*, or transverse diameters, will, in general, be found to have a less proportion to the *inantinial* than they have in man. The *inantinial* appears therefore to have some connection with the *facial* angle, which gradually diminishes as the *inantinial* diameter increases. Should any of my readers require an explanation of this angle, it is formed by two lines, one drawn from the middle of the *meatus auditorius externus*

K 2

to

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\* An English plural instead of *crania*, as the singular is partly naturalized.

to the inferior part of the nostril, and another called the *facial* line, drawn from the same part of the nostril to the superciliary ridge of the os frontis. In some of the Grecian antiques, this is an angle of 100 degrees, and in some negroes an angle of 70. When beyond 100, the face is monstrous; when below 70, it is that of a brute. Even when 100, the face is unnatural; and it is very seldom indeed that we ever find it so high as 90.

In the Grecian antiques, the maxillary bones, with the depth and firmness of maturer years, retain the shortness peculiar to youth; and are never lengthened so as to hold a quantity of teeth of the number and dimensions that are usually found in the jaws of an adult. The brow therefore projects beyond the face, and the nose descends in a straight line. In reasoning coolly, the form would strike us at once as absurd, and as an unjustifiable deviation from nature; but the senses and passions get interested, and we feel pleased with the genius of the artist who, thus combining with taste and judgment whatever is comely and beautiful in youth, with what is noble

noble and dignified in age, insensibly produces an agreeable impression. Although the features be rather extraordinary, we feel pleased with the general appearance, in the same manner, as we like to see what is not very common; a steady and prudent manliness in a child, and a certain degree of sprightly vivacity in an old man. But should it be asked, Why a similar projection of the face should be less agreeable than that of the forehead? the answer is obvious: The projection of the forehead, to the extent in which it is carried in the Grecian antiques, only surpasses our standard of excellence; and so always impresses us with an idea of a more than usual dignity in the countenance. The projection of the face, on the other hand, is rather below our ideal standard; necessarily lengthens the *inartificial* diameter; and produces an appearance that is very nearly approximate to the brutes. The association of our ideas, it must be allowed, has also its influence. Many of the Simiæ, though beautiful in themselves, become exceedingly ugly and disgusting when viewed as men, or as



intended imitations of our species; while the longer face and the more receding forehead of the greyhound are deemed elegant, because he is tried by a standard of his own, and no comparison secretly instituted between him and man.

The facial line does not therefore show what is beautiful and deformed in nature; but merely ascertains the inclination of the face to that line which is drawn from the ear to the inferior part of the nostril. In Camper's figures, this line is always supposed to be horizontal, and drawn from the middle part of the orifice of the *meatus auditorius externus*. Did Camper foresee that this line might change its position while the form of the head continued the same?

In the young skeleton, where the bony meatus is entirely wanting, and where the line must consequently be drawn from the middle of the ring to which the membrana tympani is attached, will its direction be found the same, with regard to the face, as in the adult? Certainly not. The membrana tympani, or bottom of the external meatus, is more forward, inward, and

and downward, than the orifice where it is joined to the concha; and therefore the direction of this line, with regard to the head, must vary with the changes and relative situation of the meatus; a situation which is known to be different in different animals. In the cat, for instance, it enters horizontally; is more *basilar* than the zygomatic arch; and its *basilar* margin, if we now may venture to use that language, is more basilar than the base itself, or advances farther in the basilar direction.

In the babyroutia, the meatus is long; runs from the tympanum in the *coronal*, *lateral*, and *inial* directions; or rises upwards, outwards, and backwards, supposing the erect posture of the animal, and the base of the head at right angles to the vertebral column. In this animal the external orifice of the meatus is more *coronal* than the zygoma, or more towards the crown of the head. If in these two instances, therefore, we were, in the manner of Camper, to draw the horizontal line from the middle of the orifice of the meatus, we should draw it from different points of the head, or from

points that do not correspond in relative situation.

The other point to which it is drawn is likewise variable with respect to position. In man and quadrupeds it is found near the maxillary curve. In birds it is sometimes at one extremity of the maxilla, sometimes at the other, and sometimes in the middle. In cetaceous animals, the spiracula, or breathing holes, run in a direction obliquely from the base towards the *corona*, and terminate in the face near the *glabellar* part of the cranium. The angle formed by the facial line and the horizontal, in such cases, would, in some instances, be larger than the human: For these reasons, if we wish to ascertain the shape of the head in any respect, it would be more accurate, instead of this *auri-nasal* line, to draw a *basilar*, or even two *basilar* lines; one running along the basilar side of the palatine plate of the upper maxilla, and another along the base of the lower maxilla, and both produced, till they meet the facial line. With this line, which is likewise produced, they will  
form

form two angles; one, the *basi-facial* of the superior or *coronal*; and the other, the *basi-facial* of the inferior or *basilar* maxilla.

Where the line drawn on the palatine plate is interrupted by the alveolar process, a line may be drawn from the *dermal* side on the supposed continuation of the palatine plane.

Where the palatine plate is convex or concave, the line is supposed to be drawn on a plane that passes through its *inial* and *antinal* extremities; and in the other maxilla, if the basilar side be convex or concave, it is supposed to be drawn on a plane that proceeds from the angles to the *basilar* or lower side of the curvature.

As the palatine plate is either parallel, or nearly parallel to the plane of the mouth, the angle formed by that plane and the facial line may also be taken, and distinguished from the others by the name of the *ori-facial* angle; nay, as this angle may always be easily and accurately taken in the living body, it may oftener be useful in ascertaining, analogically, the inclination of the face and the form of the head than the other two.

Should

Should the question be put, What advantages are we to expect in compensation for all this trouble? the answer is, That a steady attention to these lines, diameters, and angles, must lead to more clear and precise ideas than we hitherto have had upon the comparative anatomy of the head; and if ever a language peculiarly fitted to express these ideas were generally adopted, no anatomist, no physiologist, or physiognomist, would presume to indulge in vague declamation; or venture, with any reason, to complain, from affectation of mystery, or of something new, that he wanted terms to express his thoughts and his singular observations.

It is true that every object in nature will exhibit a number of discriminating characters if accurately examined, and every one may have marks of his own by which he distinguishes them; but if every one should describe an object only by marks peculiar to himself, we should never discover that the object was the same; but rather conclude, that the objects were as different



rent as the descriptions. In this way, no one could possibly understand the descriptions of another ; and one might describe an object as new which had been described an hundred times before. It is therefore necessary to attend to marks of a certain kind, particularly those by which an object is classified and arranged. After acquainting us with these characters, we come to know the genus and species to which it belongs ; and then an author may enumerate as many characters as he chooses, for now we begin to understand the subject of which he is treating. It was thus by directing the attention of mankind to certain characters, that Linnæus taught naturalists all to speak in the same language, and to be intelligible to one another ; and it is by adopting a similar method that we ever can expect, on rational principles, to improve our knowledge in general anatomy. It is therefore to be hoped that were anatomists, in describing the heads of different animals, always to give us the proportions and magnitudes of certain lines, diameters,

diameters, and angles, we should very soon acquire more general, and precise information upon that subject than we now possess.

As an accurate knowledge of relative position is likewise of the greatest importance in anatomy, we should never neglect, where it is possible, to mention the situation and aspect of every part that is worthy of notice. A careful attention to these circumstances will gradually secure to us more accuracy, with regard to descriptions in surgery, physic, zoology, and anatomy; will render our knowledge of the uses and functions more perfect; and will therefore give more than an ordinary degree of clearness and precision to our physiological reasonings and conclusions.

The terms here suggested for the head containing no allusion to the bones, and being somewhat different in principle from several of those which have been suggested for the trunk and extremities, I shall illustrate the mode of applying them by a few examples. Let us take, for instance,

stance, the parietal bone of the human species. It has two sides, one convex and the other concave ; which, in point of aspect, are *dermal* and *central*. In point of situation, *coronal* and *lateral*. It has four margins, which, in point of situation, are likewise found *coronal* and *lateral* ; but, in point of aspect, *glabellar*, *mesial*, *inial*, and *basilar*. It has also four angles, each angle lying between two of the different margins ; and which therefore may be named the *glabello-mesial*, *glabello-basilar*, the *inio-mesial*, and the *inio-basilar*.

Examining this bone in the deer and sheep, where we see no division by sagittal future, its two surfaces are convex and concave ; and in point of aspect, *dermal* and *central*, as they are in man. In point of situation, they are somewhat different, being *inial* and *lateral* ; and with respect to the different aspects of its four margins, two are *antinial*, one *coronal*, and a fourth *basilar*.

Take the frontal bone of the human subject as another illustration. Its two surfaces are  
*dermal*

*dermal* and *central*; their situations *coronal*, *basilar*, *lateral*, *glabellar*; the aspect of its margins, where connected with the sphenoidal bone and *glabellar* part of the ethmoidal, is *inial*; where connected with the lateral part of the ethmoidal bone, *mesial*; where it joins the malar bone, *lateral*; and where it meets the nasal and maxillary bones, *basilar*.

The eye will serve for our last illustration. In the human subject its situation is *glabellar*. The aspect of the pupil, as in all animals, *peripheral* or *dermal*; but where the nerve enters, it is *inial*, or, more strictly speaking, *inio-mesial*. The other aspects are *coronal*, *basilar*, *lateral*, and *mesial*.

In those animals where the eyes are in the lateral parts of the head, the pupil is *dermal*, the entrance of the nerve *mesial*; the other aspects *coronal*, *basilar*, *inial*, *antinal*.

Where the situation of the eye is *coronal*, the pupil is *dermal*, the entrance of the nerve *basilar*; the other aspects *inial*, *antinal*, *lateral*, and *mesial*.

Such

Such language, it will easily be seen, is chiefly necessary in comparative anatomy, where we soon learn that the singular variety which we discover in the actions, habits, and functions of animals is principally owing to certain changes or modifications in the intimate structure, in the relative magnitude, situation, and aspects of the different organs; and where we perceive, that the Author of Nature has by these changes varied the same general fabric innumerable ways; given it a thousand different instincts, appetites, and passions; adapted it to every element and climate, and to endless diversities with respect to food and the modes of life.

As the means by which He has produced these effects cannot be thought unworthy of inquiry, a language calculated to express the circumstances on which they depend, must surely be desirable to every person the least interested in zoological investigations. In mere changes of aspect and position, the naturalist must observe a number of important and specific differences; the physiologist must see correspondent and  
necessary



neceſſary changes on the functions ; and the natural theologift, in ſuch changes, cannot fail to remark, with peculiar ſatisfaction, the admirable diſplays of that boundleſs power, wiſdom, and foreſight, by which the great Sovereign of the Univerſe has peopled the air, the water, and the earth, with innumerable myriads of animated beings ; varied the ſame general ſtructure ſo as to ſuit every poſſible circumſtance ; and, amidſt the daily and the hourly millions of thoſe events which we call contingencies, ſecured the perpetuity of the ſpecies, fixed the time of individual exiſtence, regulated the periods of thoſe functions which return occaſionally, and every where ſettled the extent, duration, and ſucceſſion of thoſe which produce growth, vigour, and decay.

If ſuch ſpeculations accord not with the views of the medical practitioner, he is at leaſt certainly concerned in the knowledge of relative ſituation and aſpect ſo far as regards the human body ; the ſurgeon requires it in all his operations ; the phyſician requires it in reaſoning

soning upon symptoms and the seats of disease; and for the anatomist to attempt any description without it, is like venturing to sea without a compass or a star to guide him; like a geographer trying to explain a map without lines of meridian or longitude, where he cannot distinguish the north from the south, and has no scale to ascertain the relative distances. In short, without a knowledge of position and aspect, he is a traveller wandering at random, blind and in the dark, not able to say whence he came nor whither he is going, and who steps as readily over a precipice or into a river as he does into the road.

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CHAP. VII.

THE NEW TERMS ENUMERATED.

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FOR THE HEAD.

See Page 144, &c. and Plates III. IV. V.

Coronal

Bafilar

Inial

Glabellar

Antinial

FOR THE TRUNK.

See p. 100. and Pl. I. II.

Atlantal

Sacral

Dorsal

Sternal

To be occasionally extended to the head, when we mean to express its relative situation with regard to the trunk. See p. 102.

TERMS

## TERMS COMMON TO THE HEAD AND TRUNK.

See p. 121. and Pl. I. II. III.

Dextral

Sinistral

Lateral

Medial

## FOR THE ATLANTAL EXTREMITIES.

See p. 124, 125. and Pl. I. II.

Ulnar

Radial

Anconal

Thenar

## FOR THE SACRAL EXTREMITIES.

See p. 127. and Pl. I. II.

Tibial

Fibular

Rotular

Popliteal

TERMS COMMON TO BOTH KINDS OF EXTREMITIES. See p. 124. and Pl. I. II.

Proximal

Distal

TERMS COMMON TO THE HEAD, TRUNK, AND EXTREMITIES. See p. 120.

Dermal

Peripheral

Central

SECT.



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 SECT. I.

*The new Terms, by a change of Termination,  
may be used Adverbially.*

INSTEAD of the words *upward, downward, backward, forward, outward, inward, and toward*, which so frequently occur in almost every anatomical description, and in a sense fully as vague as *superior, inferior, posterior, anterior, external, and internal*, we may, with a slight degree of variation, employ the new terms as so many adverbs. Thus,

## IN THE HEAD,

Coronad will signify towards the coronal aspect

Bafilad . . . . . towards the basilar

Iniad . . . . . towards the inial

Glabellad . . . . . towards the glabellar

Antiniad . . . . . towards the antinial

## IN THE TRUNK,

Atlantad will signify towards the atlantal aspect

Sacrad . . . . . towards the sacral

Dorsad . . . . . towards the dorsal

Sternad . . . . . towards the sternal

## IN THE HEAD AND TRUNK,

Dextrad will signify towards the dextral aspect

Sinistrad . . . . . towards the sinistral

Laterad . . . . . towards the lateral

Mesiad . . . . . towards the mesial

## IN THE ATLANTAL EXTREMITIES,

Ulnad will signify towards the ulnar aspect

Radiad . . . . . towards the radial

Anconad . . . . . towards the anconal

Thenad . . . . . towards the thenal

## IN THE SACRAL EXTREMITIES,

Tibiad will signify towards the tibial aspect

Fibulad . . . . . towards the fibular

Rotulad . . . . . towards the rotular

Poplitead . . . . . towards the popliteal

## IN BOTH KINDS OF EXTREMITIES,

Proximad will signify towards the proximate aspect

Distad . . . . . towards the distant

## IN THE HEAD, TRUNK, AND EXTREMITIES,

Dermad will signify towards the dermal aspect

Peripherad . . . . . towards the circumference

Centrad . . . . . towards the centre

## SECT. II.

*The new Terms, by another change of Termination, may express Connection.*

WHAT belongs to the *atlas*, *sternum*, and *sacrum*; to the *radius*, *ulna*, and *ancon*; to the *tibia*, *fibula*, *rotula*, and *poples*, being somewhat different from that which belongs only to their aspect or situation, in order to prevent any confusion, it may be necessary to mark the distinction by another change in the termination. Thus, .

Atlanten

Sacren

Sternen

Radien

Ulnen

Anconen

Tibien

Fibulen

Rotulen

Popliteen

May

May be used in cases where the reference is not merely to the aspect, but to the part from which the aspect has derived its name. On this principle a *radial* artery, or a *radial* muscle, will be an artery or muscle belonging merely to the *radial* aspect; while a *radien* artery will be one that enters the radius itself, and a *radien* muscle one particularly connected with the radius by origin or insertion. Or the principle may even be extended farther, and a regular distinction made between the terms that denote simply position or aspect, and those which imply a particular connection. For instance, let the terms of the first kind always terminate in *al* or *ar*, and those of the second always in *en*, as represented in the following columns.

Coronal	Coronen
Basilar	Basilen
Inial	Inien
Glabellar	Glabellen
Antinial	Antinien
	Atlantal



Atlantal	Atlanten
Sacral	Sacren
Sternal	Sternen
Dorsal	Dorsen

Dextral	Dextren
Sinistral	Sinistren
Lateral	Lateren
Medial	Medien

Radial	Radien
Ulnar	Ulnen
Acromial	Anconen
Thenar	Thenen

Tibial	Tibien
Fibular	Fibulen
Rotular	Rotulen
Popliteal	Popliteen

Distal	Disten
Proximal	Proximen

Dermal

Dermal	Dermen
Peripheral	Peripheren
Central	Centren

NAY, as there are other terms in anatomy which allude to particular positions and aspects, and which are likewise occasionally employed to denote a different sort of connection, it might also contribute to accuracy of description to intimate this difference in their sense by a similar difference in their termination. I shall here enumerate several of the terms to which I allude.

Frontal	Fronten
Parietal	Parieten
Temporal	Temporen
Occipital	Occipiten
Sphenoidal	Sphenoiden
Ethmoidal	Ethmoiden
Nasal	Nasen
Malar	Malen
Maxillar	Maxillen
	Cervical

Cervical	Cervicen
Lumbar	Lumben
Costal	Costen
Chondral	Chondren
Clavicular or Clavar	Claviculen or Claven
Scapular	Scapulen
Humeral	Humeren
Carpal	Carpen
Metacarpal	Metacarpen
Digital	Digiten
Iliac	Ilien
Pubal	Puben
Ischial	Ischien
Femoral	Femoren
Tarsal	Tarsen
Metatarsal	Metatarsen

But as this change of the termination is intended always to intimate some change in the meaning, it can never be necessary in those cases where the meaning of a word is always the same, or where the meaning is fixed by the context and cannot be mistaken. It would be

a childish and absurd affectation, for instance, to say, fronten, temporen, and parieten bones, or musculen, glandulen, and reticulen structure; when we mean nothing more than what is expressed by the usual words frontal, temporal, parietal, muscular, glandular, and reticular. It should therefore be remembered, that the change is intended only for the cases where the words convey, or are apt to convey, a twofold meaning; where they sometimes allude to position and aspect, sometimes to connection, and where it is proper at the same time to mark the distinction, as often happens in our descriptions of the nerves and blood-vessels, where the double sense most frequently occurs.

SECT.

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 SECT. III.

*To shorten Description, the new Terms may be made to enter into Composition.*

IN expressing position, direction, or attachment, the above epithets may occasionally be compounded by substituting *o* for the *al* or *ar* of the first column, and by adding it to the *en* of the second. Thus the position of the heart in the thorax will be expressed by the two compounds *mesio-sinistral* and *atlanto-sacral*; or, using the adverbs, we may say its direction from the mesial plane is *sinistrad* and *sacrad*, or *sinistro-sacrad*. In describing the direction of the superficial femoral artery, we may say that at first it is *rotulo-tibial*, then *tibio-popliteal*. In mentioning the direction of the sartorius, we may say that, like the artery, it is at first *rotulo-tibial*, then *tibio-popliteal*, and at last, after passing the knee-joint, *tibio-rotular*. But  
in



in mentioning its attachments, we must lay aside the epithets which are made to terminate in *al* or *ar*, and employ those which terminate in *en*. Thus in expressing its origin and insertion, I would not think of using the word *ilio-tibial*, but *ilieno tibien*. In many descriptions, though this minuteness may not be necessary, it is always some consolation to reflect, that when it is necessary, we possess a language calculated for such minuteness and accuracy.

SECT.

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 SECT. IV.

*Division of the Sanguiferous System into two  
Parts, and new Names.*

**I**F the sanguiferous system of man and others of the nobler animals be divided into two parts, the *Pulmonic* and *Systemic*, in that case there will naturally follow a change in the language resulting from the change of classification, which the Table subjoined is intended to exhibit. See p. 122, 123.

Pulmonic veins.	All the veins which convey blood from the system at large towards the lungs.
Pulmonic sinus.	Right sinus.
Pulmonic auricle.	Right auricle.
Pulmonic ventricle.	Right ventricle.
Pulmonic artery.	Pulmonary artery.
	Systemic

Systemic veins.	Pulmonary veins, or the veins which convey blood from the lungs to the system at large.
Systemic sinus.	Left sinus.
Systemic auricle.	Left auricle.
Systemic ventricle.	Left ventricle.
Systemic artery.	Aorta.

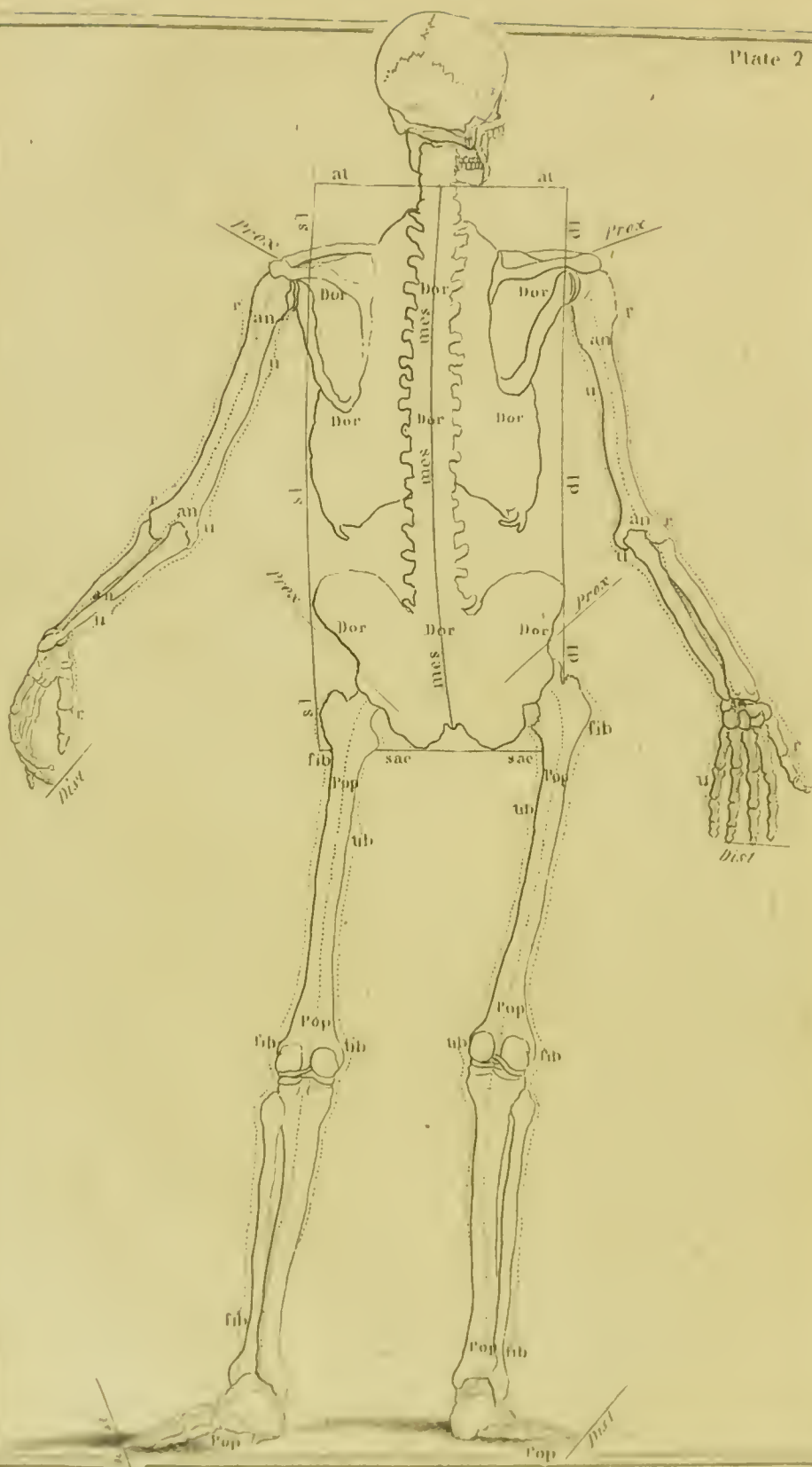
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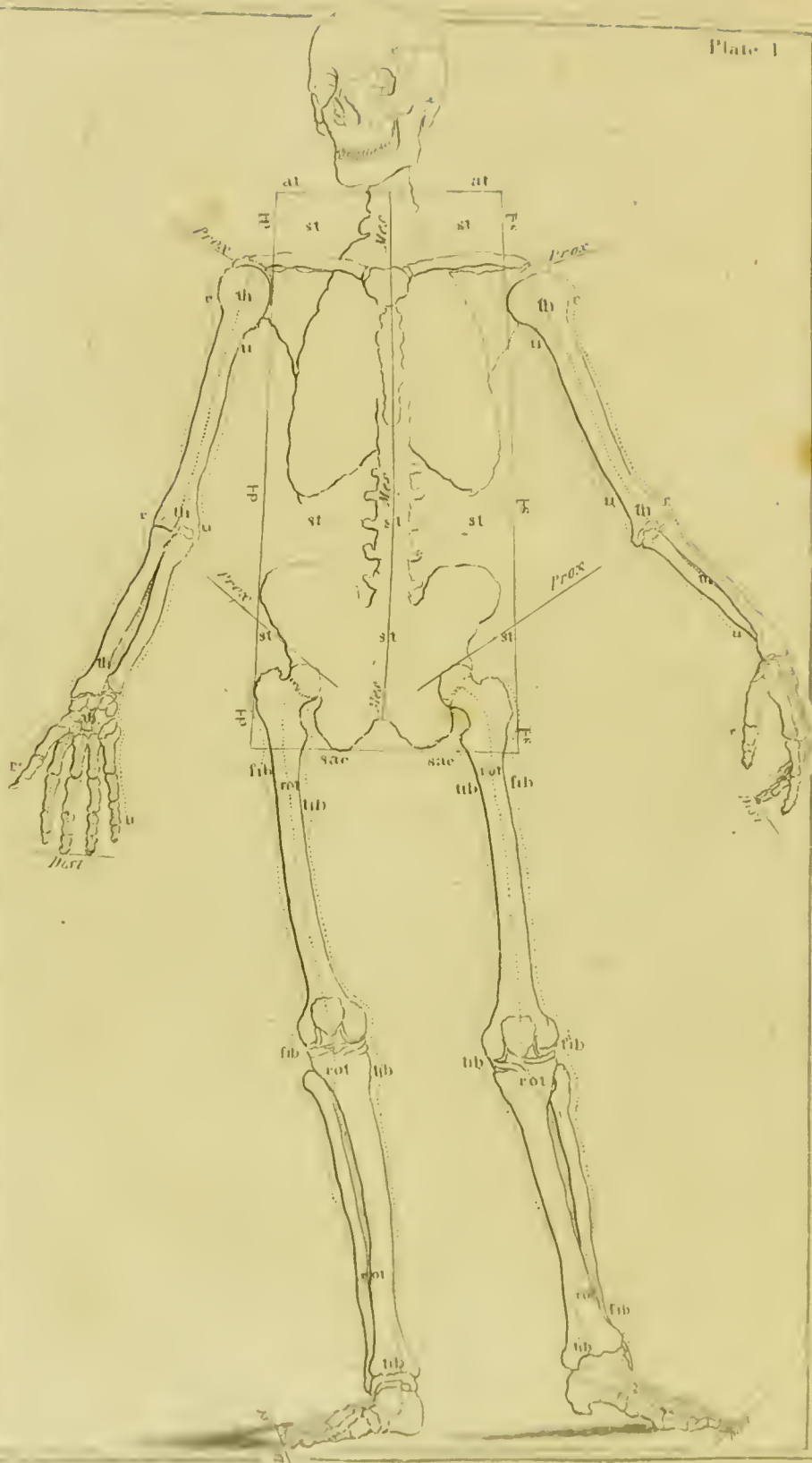












## EXPLANATION OF THE PLATES.

*See p. 162, 163, 164.*

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PLATES I. and II. are two outlines of the skeleton, drawn in the attitude given by Albinus. They show all the aspects of the trunk and extremities except the *dermal* and *central*, which are easily understood without any assistance from a figure.

The four lines in which the trunk and part of the neck are inclosed, exhibit the *atlantal*, *sacral*, *dextral*, and *sinistral* aspects, marked *at. sac. d.l. f.l.* (*d.l.* for *dextral* or *lateral*, and *f.l.* for *sinistral* or *lateral*).

The line drawn in the middle, marked *mes.* is the *sternal* edge of the *mesial* plane, passing through the body from the *sternal* to the *dor-*

*pal* aspect, and dividing it into similar and lateral halves.

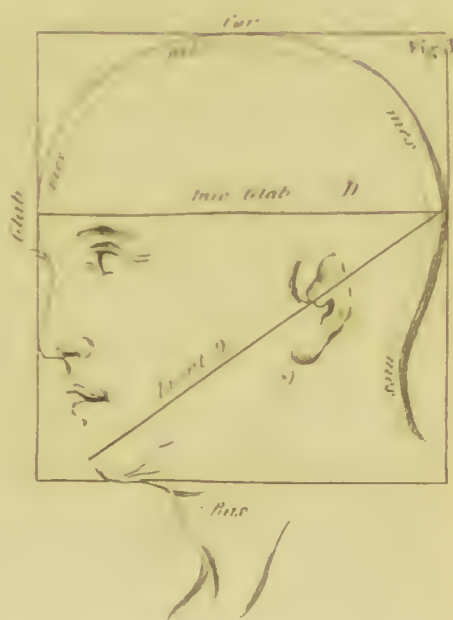
In the *atlantal* extremities, the four dotted lines marked *r. u. tb.* and *an.* show the *radial*, *ulnar*, *thenal*, and *anconal* aspects. Where the radius is in a state of pronation, the aspects appear to cross one another towards the *carpus*.

In the *sacral* extremities, other four lines of the same kind, marked *tib. fib. rot.* and *pop.* show the *tibial*, *fibular*, *rotular*, and *popliteal* aspects. From the relative position, however, of the leg and foot towards the ankle, these lines convey only a general idea of those aspects, which are very easily distinguished in the skeleton and living body.

In both kinds of extremities, the lines marked *prox.* and *dist.* show the *proximal* and *distal* aspects.

PLATE III. shows the aspects of the head and the *mesial* plane in different views. Fig. 3. exhibits at the same time the *ino-glabellar* and  
the

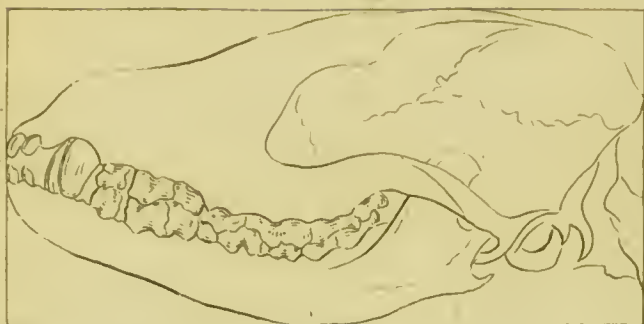








Dors.  
Cerv.



Dors.  
Lum.

Dors.  
Stern.

FROG.



Dors.  
Cerv.

See page 117.

Invertebr.

Dors. Glab. D

Dors.  
Stern.

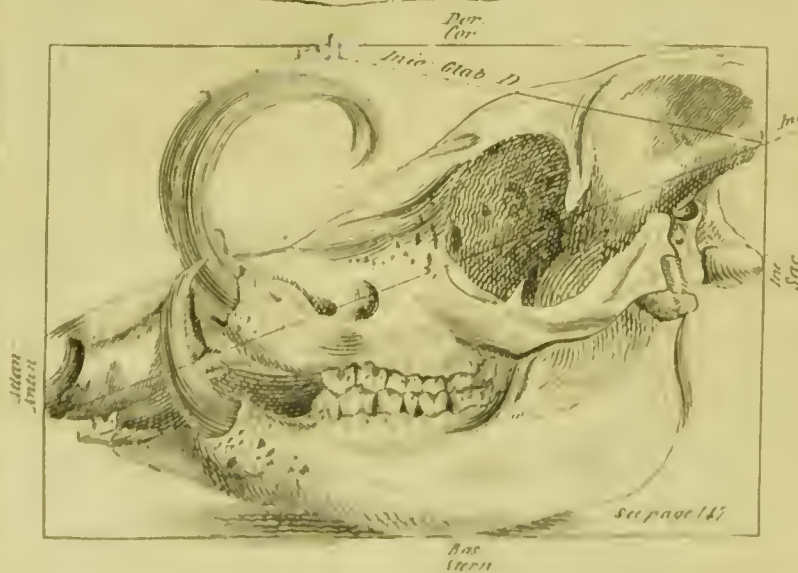
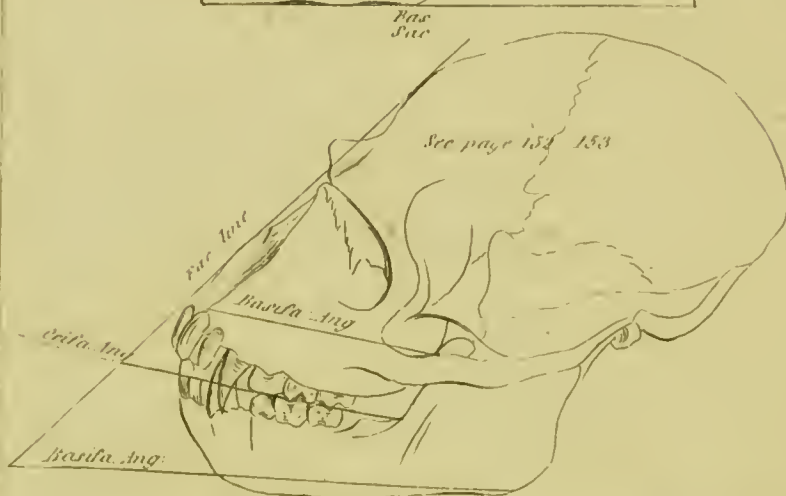
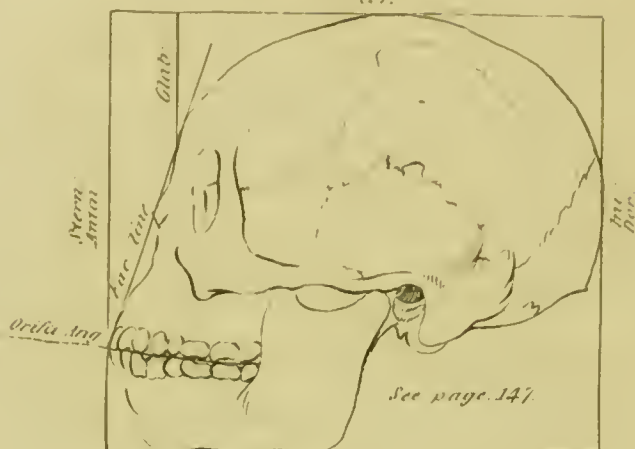


Int.  
sac



Plate IV

Adam  
Cor.





the *inantinial* diameters ; which compare with figures 3. in Plates IV. and V.

PLATE IV. fig. 1. and 3. show how the aspects of the head and trunk correspond respectively in man and the babyroussa. Fig. 1. shows, besides, the *ori-facial* angle. Fig. 2. the two *basif-facial* angles, and the *ori-facial*. Fig. 3. the *inio-glabellar* and *inantinial* diameters.

PLATE V. shows farther how the aspects of the head vary with respect to the trunk in different animals ; and how the parts that are *atlantal* in man, become *dorsal* ; the parts that are *inial*, *sacral* ; the parts that are *basilar*, *sternal* ; and the parts that are *sternal*, *atlantal* as we descend in the scale of being. These aspects of the head, however, will have other positions with regard to the trunk, according to the motions of the living animal ; and different parts may in succession be *sternal*, *dorsal*, *atlantal*, and *sacral*. To guess therefore at the form and structure of the animal, from these relative

lative positions, we must fix on some one that is definite. The position here supposed is that where the vertebral line is continued through the cranium at right angles, or perpendicular to the plane of the *foramen magnum*.



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